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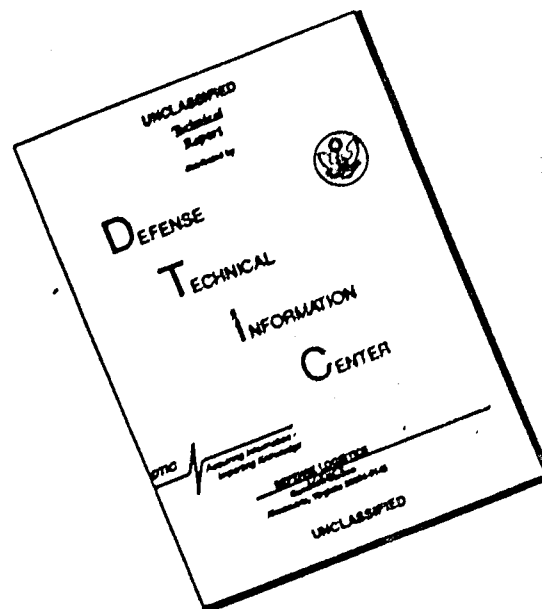


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DEPARTMENT OF THE ARMY
OFFICE OF THE ADJUTANT GENERAL
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IN REPLY REFER TO

AGAM-P (M)(9 May 69)

FOR OT UT 69B012

15 May 1969

SUBJECT: Senior Officer Debriefing Report: MG George I. Forsythe,
CG, 1st Cavalry Division (Airmobile), Period 19 August
1968 to 23 April 1969 (U)

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1. Reference: AR 1-26, subject, Senior Officer Debriefing Program (U), dated 4 November 1966.
2. Transmitted herewith is the report of MG George I. Forsythe, CG, 1st Cavalry Division (Airmobile), subject as above.
3. This report is provided to insure appropriate benefits are realized from the experiences of the author. The report should be reviewed in accordance with paragraphs 3 and 5, AR 1-26; however, it should not be interpreted as the official view of the Department of the Army, or of any agency of the Department of the Army.

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Kenneth G. Nickham

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Debriefing Report

Country: South Vietnam

Debriefing report by: MG George I. Forsythe

Duty Assignment: CG, 1st Cavalry Division (Airmobile)

Inclusive dates: 19 August 1968 to 23 April 1969

Date of Report: 15 April 1969

1. This report is submitted in compliance with USARV Regulation 1-3. It covers the period August 1968 thru April 1969, during which I was privilege to serve as the Commanding General of the 1ST AIR CAVALRY DIVISION in Vietnam. I shall not cover aspects of this war, or the environment in which it was prosecuted, that are already well known or well documented. Rather, I will present some personal convictions which have grown from this experience. They will be stated in the form of assertions with only sufficient discussion to amplify my views. In a few cases, back-up documentation is attached.

2. At the outset it is germane to note that, although this report covers only the period in question, I have served in Vietnam for a total period of nearly three years, during which time I have functioned as a senior advisor to the ARVN Field Command (1958 - 1959), on the MACV staff (1967 - 1968), and as a major combat unit commander (1968 - 1969). These assignment opportunities, over a period of ten years, have given me an observation point to view the war, the enemy, and the operations of most of the US and ARVN Division. Thus the opinions expressed in the following paragraphs have naturally been conditioned by these rather broad experiences rather than being solely limited to experience during the past year with THE FIRST TEAM.

3. The First Air Cavalry Division was assigned proper tactical roles by COMUSMACV. In early 1968 the Division was moved from II CTZ to Northern I CTZ. There, in rapid succession and with only the most austere basing facilities, it was employed in the successful Tet defensive of Quang Tri; the relief of Hue; the relief of Khe Sanh; the initial re-entry campaign into the A Shau Valley; the pacification and resource-denial campaign in Quang Tri-Thua Thien; and the defeat and pursuit of major enemy

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forces in Base Areas 101 and 114. Then, in late October early November 1968, when increased enemy forces appeared to threaten Saigon and the populated areas of III Corps Tactical Zone, the Division made a rapid strategic move. From northern I CTZ to the jungle frontier areas of northwestern III CTZ, the Division moved and deployed to interdict the movement of four enemy divisions as they attempted to move southward for an attack on the heartland of South Vietnam. The move was completed with great speed--(the first unit was in combat in III CTZ within 48 hours after it was alerted to move, and the Division was closed in 12 days)--and with strategic surprise (the enemy was confronted suddenly with a major force air assaulted astride his avenues of approach and into his prepared base areas with no prior warning). During the first nine days of the twelve day move, one brigade concurrently conducted and completed a major combat operation in northern I CTZ to penetrate the My Chanh Valley VC base area. In III CTZ the Division was given an immense area of operations (4,800 square miles) was based where existing space and facilities could be found (occupying 9 bases for our aircraft fleet); was given broad mission-type orders ("constitute the II FFV covering force") and was given wide latitude and freedom of action to maneuver. In addition, care was taken not to fragment the Division or its assets, to permit the full range of its power, to find the enemy and to be shifted to fight him wherever he was found. It was proven beyond doubt that the total power of an airmobile division is greater than the sum of its parts. In short, we were given the opportunity to test the "theory of design and concept" of the airmobile division and we found it to be sound and practical.

4. The airmobile division is unhampered by tough terrain and foul weather. Suffice it to say that we conducted sustained combat operations in 5,000-foot mountain jungles of I CTZ, in the delta of II Corps, in War Zones C and D, along the Serpes Jungle Road and the Adams Road, and in the Plain of Reeds west of the Vam Co Dong. We were unencumbered by the lack of surface lines of communications cut to our battalion fire bases and to our companies. With our "zero ground pressure vehicles"--the helicopter--we found that as long as we could blast or cut a "one shipper" LZ, we could operate there. We made many battalion size air assaults with only "one shipper" beginnings. Reasonable trafficability for the foot soldier on the ground and a hard spot for his direct support-artillery to alight are the minimums required, and those requirements can almost always be found. We have operated our aircraft in the toughest of monsoon conditions. This limits operations to low level con-

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tour flying, and then, mostly on an opportunity basis, with great reliance on instrumentation and IFR qualification of pilots. But it can be done if battalion fire bases are properly stocked (about five days) and companies operating from them follow sound foul weather discipline. Prolonged bad weather affects aircraft maintenance capability, but expedient shelters can be erected. Because of its lack of dependence on the ground LOC and ground vehicles, the air cavalry division can operate over prolonged periods in very difficult terrain with far greater effectiveness and combat power than a standard infantry division. For example, I believe that, if it should suit our military objectives, an airmobile division could remain and function effectively in the heart of War Zone C or War Zone D throughout the entire southwest monsoon period. I do not believe this would be feasible for an infantry division without extensive LOC preparation or great augmentation of aircraft resources. The 1st Air Cavalry Division has been in force in War Zone C for five months now. It could remain and fight there throughout the monsoon.

5. In any war, particularly this one, accurate and timely intelligence is the key to success. At any given point in time, throughout Vietnam, only a small portion of our combat power is engaged. I would say in this Division that at any one time, when 15% of our combat forces are engaged shooting at an observed enemy target, we are having a good day. The problem is finding productive targets. If the percentage of engagements can be raised just 10%, it would be a very significant increase. Better intelligence is the key. I have these observations:

a. The Air Cavalry Squadron (1/9th Cav) is a gold mine of intelligence and target acquisition capability. This unit was biggest killer by a factor of three over the other maneuver units. It is about right in size and composition. It should not be fragmented to be employed on other missions (as ARA or gun ships) or be used as a helicopter pool to form light fire teams. Kept together in a general support armed reconnaissance role, it can produce wonders. It's the "sales force" that gets the "orders" for the balance of the combat power of the Division to produce and deliver. We should have at least an air cavalry regiment at the field force/corps level in addition to doubling the air cavalry assets organic to infantry divisions.

b. Special intelligence has been a key factor in tactical success--we'd be quite blind without it. Although one cannot rely on special intelligence alone, it provides the essential skeleton against which other source material can be associated

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to form a quite accurate framework of enemy disposition and, in some cases, enemy intentions. It is not sufficiently precise to be used in keying small unit operations; but for operations at the brigade, division and higher levels, it is invaluable as a guidepost for the general positioning of friendly forces. In many cases it provided invaluable information with respect to the timing of enemy initiatives which otherwise could not be determined through collateral sources. Special intelligence was a key factor in keying the swift and wide-ranging deployments of major elements of the 1st Air Cavalry Division; and by the same token, the Division's mobility makes it uniquely suited to respond to such intelligence.

c. The Division G-2 should be an officer of the Military Intelligence Branch. Our G-2 was an MI officer. At first I thought this to be wrong, that an officer of the combat arms would have the preferred background. However, my experience with the Division has convinced me that the G-2 should be a Military Intelligence Branch officer and that he should serve in this capacity for a full tour, rather than rotate to a new job after six months. The intelligence collection means available to a division are now so numerous, and in some cases so complex, that a professional intelligence officer is required to manage them. A Military Intelligence Officer selected as G-2 should have some combat arms experience, but I would rather take a good Military Intelligence Officer and teach him what he needs to know about the Division's combat arms operations. To train a combat arms officer in the complexities of modern tactical intelligence, and to do this in the course of his 1 year tour, is the less effective alternative.

d. An Aerial Surveillance and Target Acquisition Platoon (ASTA) is essential to an airmobile division. The rapid reaction capability of the division requires that such intelligence collection means be immediately responsive to the division commander. Although the equipment and aircraft of the ASTA Platoon can be pooled at higher levels for maintenance, the platoon itself must be under the operational control of the division. We had difficulty getting maximum utility from our existing organic platoon. The basic problem is in the age of the sensor equipment. It was difficult to maintain, and parts were in short supply. The Mohawk aircraft, however, was a star performer and is well suited as the sensor vehicle. What is needed is to update the sensor capability with the new generation of detectors and then support those systems with an adequate maintenance back-up, including repair parts and electronic technicians.

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6. We still need a solution to the bunker-busting problem. In both the I CTZ and the III CTZ the Division's concept of operations involved taking the war to the enemy by seeking him out in his base areas and destroying him and his supplies and equipment with superior firepower. When we found him, he was almost always in heavily fortified, well-concealed bunker areas. Most often, due to the heavy foliage and good camouflage, we were inside his position before he opened fire. Consequently, the initial contact was usually at very close range, extremely sharp, and many times costly. It is during the early minutes of the initial contact that we take the majority of our casualties. The point men usually draw the fire, and before they can discover the enemy position, they usually become casualties. The initial problem of the small unit leader then is to define the enemy position, get his wounded men recovered, and then hit the bunkered defenses with sufficient fire power to destroy them. Some degree of disengagement is required because of the troop safety requirements of weaponry large enough to "bust the bunkers". We have found the recovery of wounded and close range disengagement in extremely close contacts can be accomplished by using white phosphorous, smoke, or CS grenades. This will do if contact is less than 25 meters. Beyond 25 meters, close aerial rocket artillery, or tube artillery delivered CS and smoke is appropriate. Once the force is disengaged sufficiently, the immediate task is to open the jungle canopy with heavy ordnance, such as 8-inch howitzer fire and air strikes, so that bunkers can be located and the extent of the bunker complex can be determined to facilitate its destruction. The best destruction method we have found involves the use of CS, followed by CBU, tube artillery, and ARA to destroy the personnel when they exit the bunkers. We then follow with infantry to destroy the bunkers when we think the defenders have been neutralized. Alternatively, if we believe the fortified area still to be occupied, we use medium and heavy ordnance, such as 155 and 8-inch howitzer fire and air strikes to destroy both the remaining personnel and soften the bunkers. We have found that the usual ASR for heavy artillery is not sufficient for destruction of any but the smallest bunker complexes. More importantly, the ASR for CS artillery rounds is grossly insufficient and even more limiting than the heavy artillery ASR. The process described above is laborious, time consuming, and often costly; but it is the best method now available to kick the enemy out of his extensive (often 150-200 bunkers), heavily fortified (often 4-5 feet overhead cover) base areas where, in the past, he has always been secure. The problem stems from the requirement of disengage infantry a sufficient distance to permit the use of heavy ordnance. If that were not necessary, if we could stay in there

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with him" and still attack his position, we would be far better off. I believe the rifle platoon, the unit which bears the brunt of the initial contact in the bunker area, needs a new, simple, highly destructive, lightweight weapon to effectively destroy the enemy's bunker complexes. The HEAT round of LAW has been ineffective for the purpose. The CS weapons (20mm grenade and 105mm howitzer round) have been in extremely short supply. Consequently, we need to provide the infantryman with a lightweight, anti-bunker weapon which will allow the unit to defeat the enemy once it bumps into him in a heavily fortified position. A fire weapons system or one that employs effective chemicals might do the job. We do not have such a capability in country now.

7. Tactical air support, though outstanding, is insufficient. The Air Force Support received by the 1st Cavalry Division was outstanding. When troops were in actual contact, we were always able to get immediate air support. However, the availability of preplanned airstrikes was not sufficient. Considering the covering force mission and the large area of operations, the Division needed a minimum of 20 preplanned missions per day (two missions per day per battalion and Air Cavalry squadron). While working in War Zones C and D and in Base Areas 101 and 114, we were constantly in heavily bunkered base areas. During this time the Division averaged 25 preplanned mission requests per day. Of this number about one-half were allocated and fragged; a few were aborted after fragging due to mechanical problems; and usually several were diverted from "preplanned" to "immediates". Generally, therefore, we actually delivered about 6-8 missions, or a little over 25% of the initial request. We need delivery of these "preplanned" requests to hit known targets that impinge on our scheme of maneuver without having to spend lives to get "troops in contact" before the mission is allocated and fragged as an "immediate". As a planning factor, two missions per battalion per day is not an unreasonable allocation of tactical air support.

8. The B-52 program has great tactical utility and should not be curtailed. The 1st Air Cavalry Division has regarded the B-52 strike as heavy artillery of unlimited range, of great accuracy, and of tremendous psychological and destructive effect. We have habitually employed the strikes as part of our fire plan, which is closely associated with our scheme of maneuver. Particularly in heavily bunkered base areas, the B-52 strike is the only feasible system for softening up hard targets and opening up the jungle to permit the rapid introduction of ground forces at the required point. Prisoners of war

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consistently report that our B-52 attacks have not only destroyed the fighting capability of many enemy units but also have been a key psychological factor in eroding the enemy's will to fight. The current MACV policy of massing B-52 fire power is sound and increases the effect of the weapons system. More, not fewer, strikes should be available for use in defeating the enemy in his large and hard base areas in War Zones C and D.

9. Tactical psychological warfare is one field that merits considerable doctrinal and technical improvement. In this war skillfully conceived tactical PSYOPS campaigns could produce respectable results--particularly when we are defeating the enemy almost daily on the battlefield. We have attempted to develop such a campaign and have had some small measure of success. The basic problem is that in the past we have not really put the talent into the psy-war program, nor has it enjoyed much status in our officers' career pattern. As a result, the program and its doctrinal and technical foundation are primarily hardware-oriented. Leaflets, tapes, and loudspeaker broadcasts can be produced and delivered by the millions, but the message they carry is often inappropriate, unbelievable to the enemy, or out of date (either too early or too late). If we are ever to have an effective psy-ops capability, we need to put real talent into the program, then train and develop our psy-warriors with the imagination, care and attention we give to our other tacticians.

10. Trans-border sanctuaries provide the enemy with tremendous tactical and psychological advantages. I do not intend to describe in detail the method by which the enemy uses his trans-border sanctuaries, as that is well known. What is not generally recognized is that in our tactical doctrine we have developed very little in the way of coping with this problem. What is worse, for some period of time in this war, we could not even publicly recognize their existence--and thus we did little to train our military people or inform the public that the presence of such sanctuaries would have a major impact on how we fight the war, on our casualty ratio, and on the cost of the war to us. We have defeated the NVA 95C Regiment on three separate occasions, but he has always been able to pull the remnants back into Cambodia, replace losses (infiltrated from North Vietnam through Laos), refit, retrain, and take the field against us again. We know the enemy has large stores of war materials just across the border, mostly in unpopulated jungle areas. Yet, we must wait until he secretly infiltrates these supplies across an insignificant line on the map called "the border" be-

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fore we can begin the laborious and sometimes costly procedure of finding and destroying them. If our national policy is prepared to pay the cost for giving the enemy border sanctuaries, then we should openly face this problem. Then we can develop the necessary doctrine to revise our War College and Leavenworth training of officers so that our military tactics and strategy of the future will be in tune with the political facts of life.

11. Can ARVN assume the brunt of the war; and if so, when?
I've posed a tough question, and it would take a book to completely develop the answer, so I must generalize. ARVN has improved immensely during the last two years. They have a better fighting spirit; they see a possibility that the war may end more or less in their favor; their weaponry, training, and leadership have been upgraded; they are far less inclined to "remain behind the wire" at night; and their record of success in large and small contacts is approaching something respectable. Their units are still spotty, however, and range in quality from the 1st ARVN Division (as good as a US Division) down to the 18th ARVN Division ("the tired division" that has had very few successful contacts until recently). The key to the difference is not surprising--leadership. The ARVN soldier, well lead, will fight well. Poorly lead, allowed to shift for himself, undisciplined and uncared for, he will not fight well. He is no different than any other soldier. It's just that simple. So the question is, "when will the required leadership be provided?" It is being improved now, and the results show. But it takes time to develop the necessary level of leadership, and certainly it won't be accomplished in the next six months. With the present course of the Thieu administration and the level of help of MACV, the ARVN can be a respectable force in the next two-three years. Right now, the ARVN could cope with the major part of the security problem if the NVA forces were withdrawn. They certainly could handle the remnants of the VC, but as long as large "foreign" forces are maintained and supported from North Vietnam, then the balance must be maintained by positioning "foreign" forces in support of ARVN. We can reduce our foreign forces as and when the enemy removes his from the battle area--and I include Laos and Cambodia in that area. To remove sizeable US forces before the NVA go "all the way" home would be dangerous indeed. And, I emphasize "all the way" home.

12. Some factors that have affected the operations of the 1st Air Cavalry Division in Vietnam. In this paragraph I will list and discuss briefly some factors that have had an impact on our operations--favorably and adversely--because

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I think they should be considered in planning for future wars of this nature.

a. The 12-month tour policy has a strong and favorable morale impact. Retain it. Although there may be some loss of continuity and much personnel turbulence, the prospect of returning home in one year is a real "motivator," not only to the soldier but also to his family. The heavy physical and mental demands of combat in this environment can be met for one year, and a fast pace can be expected of the troops. Given a longer tour, or an indefinite tour, and either the pace would have to be slackened or troops would be inclined to burn out. A broader consideration is that the one-year rotation policy requires more input into the Army. Military service (and the self-sacrifice it demands) at this point in our national experience seems to be a big plus factor in maintaining the health of our national character.

b. The NCO candidate program is a life saver. We should continue it after the war. The so-called "instant" NCO is, by and large, an exceptionally fine combat leader. Without him, and with the shortage of experienced NCO's, we would have had a serious leadership problem. The program proves that we can identify leaders in the early weeks of their military training and by intensified training, motivation and reward, make them useful leaders in short order.

c. Some liberalization in the DA-controlled Senior NCO Promotion Policy is essential. By and large, the policy is sound and fair. However, when an E-7 who has served with exceptional distinction as a company first sergeant in the field with his company for nine consecutive months and cannot be spot-promoted by a Major General, something is wrong. I believe that we should have a "five percenter" policy where senior field commanders can make "impact" promotions in exceptionally deserving cases. The morale impact on all of the soldiers would be great when they see a recognized leader promoted "in the field---by the field".

d. We have far too many senior NCO's assigned to combat units who have valid physical profiles. We are about up to strength in E-7, yet only about one-half of them are physically qualified for service in the field in the MOS against which they were assigned. This leaves the job of field leadership to junior and inexperienced NCO's. We should reclassify our people into a useable MOS before they are sent to Vietnam. We are doing this job here at an extra administra-

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tive cost and having to carry these people for the long period of time it takes to get the reclassification accomplished and the new requisition in and filled.

e. The MTOE authorizing recognized spaces for a division to perform its tasks in Vietnam should be implemented at once. The Department of the Army has recognized the need for such functions as a 24-hour per day operation in the TOC at division and brigade; the need for a small visitors' bureau at division level to handle the endless parade of visitors; the need for a small group of people to handle problems associated with installation management. These people come out of our hide now. If we are to perform these functions, we should provide the people to do so without having to bleed the fighting elements of the Division. Authorizing over strength in the assignment of personnel is not the best solution in solving this problem.

f. We are experts in air mobility; yet, we had a comparatively low aircraft mission ready rate. A confession! When measured against USARV averages and compared with other aircraft operations in Vietnam, we had a noticeably lower "mission ready" record. There are many contributing reasons for this, as the enclosed study, conducted jointly by USARV and 1st Air Cav Division, will detail. It should be mentioned here, however, that the designers of the air mobile division visualized that, at any given time, two of the brigades (six battalions) would normally be employed in active airmobile combat operations, while a third brigade (three battalions) would be employed to defend the division's base system, and thus not be a heavy claimant for aviation assets. Thus, the provision of aircraft and aircraft maintenance assets was conditioned by this concept to facilitate some reduction in the size of the fleet. In actual practice, however, this employment pattern was not followed. We habitually employed all three brigades in active air-mobile combat (nine battalions) and always supported at least three (and often as high as six) additional ARVN or US battalions under our operational control. We provided these OPCON units the same aviation support we gave our organic units. Thus, we "stretched" the basic design of the airmobile division's air assets to a considerable degree. Other important reasons for a somewhat lower statistical record were: repetitive large-scale operations (the move from II CTZ to I CTZ, Tet, Khe Sanh, A Shau, Jeb Stewart, the move to III CTZ, and the Cambodian border campaign all fell on the heels of one another); being at the very end of the supply pipe line in "Marine land"; shortage of maintenance personnel for a

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considerable time; higher battle damage than any other unit; and the shortage of parts and tools. But the principal factor stems from my philosophy on the expenditure of aircraft "blade time". The management method most practiced by non-air cavalry aviation units in Vietnam is to determine the mission ready rate that is desired and then to fly the fleet in such a way as to maintain that rate. It is my opinion that the design, mission, and concept of employment of the air cavalry division will not permit such an "asset oriented" approach. Rather, I feel we must use an "enemy oriented" approach. In short, I keyed our flying primarily to the demands of the tactical situation and not primarily to achieve a better line on the comparative "mission ready" chart. Although we try to stand down 30% of our mission ready fleet each day, if response to the enemy demands it, we fly; and we fly for as long each day as it is necessary. The result--in most of the "bread and butter" types of aircraft, we were comparatively lower than most other units by a few percentage points of "mission readiness". Yet, we were never unable to perform the demanding, wide-ranging mission against four enemy divisions in a vast and primitive AO. No one can quantify the delay of three months in the four NVA divisions in their move from the Cambodian border to the Saigon-Bien Hoa area; the 5,000 enemy dead; the tons of supplies and munitions destroyed; and the abortive nature of his eventual so-called "1969 Spring Offensive". Of course, the 1st Air Cav Division didn't accomplish all this singlehandedly. But I think it is generally accepted that we had an important impact on slowing his move and foiling his attempt at an offensive. However, if one could quantify the tactical results achieved, then one would have to determine if the results were or were not worth 5 or 10 percentage points in aircraft availability. I chose to think that it was a reasonable price to ensure mission accomplishment. Certainly we can do more to improve our management of aviation assets, and we are. Many reforms have been instituted, including that of reorganizing our maintenance structure and closer control of our flying (at this writing our overall mission ready status stands at 75 percent). But an airmobile division--an air cavalry division employed in a classic cavalry role--must key on the enemy and fight its battles where, hopefully, it can find them. That's my philosophy; and if that isn't sound management--then it's my confession.

g. Aircraft accidents--another confession. We had a reasonable but far too high aircraft accident rate to suit me. I worked hard on this--up to a point. The point where I began to let up was that unidentifiable point where the

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pilots, and the soldiers they support, began to growl at each other. For example, the 1st Cav has evacuated Marine wounded in Northern I Corps, at the request of senior Marine ground commanders, when Marine pilots refused--because of flight safety rules--to fly the mission. That is a situation that we must never permit to occur in the Army. An Army aviator is nothing more than a soldier who possesses an acquired skill. He is a soldier first--an aviator second. Now, most of our accidents are caused by "pilot error". Some of these pilot errors include trying to carry in those extra cases of ammunition to a company deep in the jungle; trying to make a down-wind take off to avoid air-to-ground fire close by a confined LZ; trying, when he knew better, to land in a hastily prepared, too small, pad to evacuate wounded at night. These are all pilot errors and must be corrected. But I avoided pushing too hard on these because I felt it important not to destroy the bond that now exists between the infantryman and the airman. It's a very close and treasured bond, and it gives both of them a great deal of confidence in the heat of battle. That bond must be preserved with great care lest, one day, we have to call on the Marines to evacuate our wounded.

13. One final--but not so universally recognized--point. It is certainly generally recognized by any military leader who has been privileged to serve with today's soldier in Vietnam combat that our country's future can be safely entrusted to the young. Today's young soldier is a splendid soldier. Independent, imaginative, critical, inquisitive, self-sacrificing, mature, and brave--that's him. But when one considers him in the context of our times, he is even more marvelous! He is fighting a tough and cunning enemy whom he must come to appreciate and master, almost at arms length. He is fighting in a quite unpleasant environment, foreign to his experience of relative comfort and sophistication. He is placing his life in the hands of junior combat leaders not much more experienced and certainly little older than he. He is participating in a war that is probably neither supported nor understood by his loved ones. He is willing to lay his life on the line for an eventual outcome that is quite unclear to him and, apparently, to many of his political leaders. But this quick-grown teenage man is a professional in every respect. He "humps it" in the jungle for months on end without anything more serious than a soldierly gripe. He defends "his wire" under intensive human wave attacks made by little people he neither understands nor hates. He calmly drinks his warm Coke, flips his cigarette butt, and hops on the floor of a chopper to fly off to some stinking hole in a jungle called an LZ to face whatever challenge awaits him there.

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He is a professional soldier, and he is a strong American citizen. Somehow he senses that what he is doing is right and worthwhile. No matter what the outcome of this war for us, we all can be proud of him and thankful for his strength and faith in our future.



GEORGE I. FORSYTHE
Major General, USA
Commanding

3 Incl

1. Ltr, USAFV, 20 Jan 69
2. Ltr, DIVARTY, 1ACD, 5 Apr 69
3. Tactical Operations against
Bunker Complexes.

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HQ USARV
APO 96375
201200 January 1969

AVHAV-SG

SUBJECT: Study of Aircraft Operational Ready Rates in 1st Cavalry
Division (AM)

1. PURPOSE: To determine those steps which can be taken, both within and without the 1st Cavalry Division (AM), to increase the daily operational ready rate of aircraft of the Division up to the DA standard without impairing the operational activities of the Division pursuant to the directive of the DCG, HQ USARV (Annex A).
2. SCOPE: This study, which is conducted within the context that no lessening of tactical operations is acceptable, examines the areas of personnel, supply, tools and equipment, maintenance and organization. Where required, comparisons are made against the flying hour requirements and the designed capability of the Division as reflected by the TO&E.
3. BACKGROUND: The 1st ACD was deployed to RVN in September 1965. Since arrival in country, the operational ready rates of the Division have been below the overall USARV levels. The Division experienced the lowest period in its history in 1968 when the average monthly availability rate was 60% compared to a monthly average of 71% experienced in 1967.

The concepts under which the Division was organized envisaged the simultaneous employment of two brigades away from the Division base while the third brigade was to be utilized in protection of the Division base. The aircraft support concept was designed to provide peak availability for short duration-high intensity operations. This concept provided for reduced lift requirements following peak operations to allow time for all levels of maintenance support to regain the desired level of operational readiness.

Mission requirements and experience, however, have dictated changes in organizational structure and concept of employment. An increase in the number of maneuver elements and combat support units has not been accompanied by an equal increase in lift capability. Mission requirements have necessitated sustained employment of all three brigades away from a fixed divisional base. Such commitment has required a constant level of aircraft support that has precluded efficient aircraft programming for flight or maintenance support.

In addition to the broad conceptual changes that have occurred, the

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history of the specific employment of the Division highlights certain factors which have impacted on the availability rate of the Division. Foremost is the fact that the Division does a lot of fighting; therefore, the flying is of an intense, hazardous nature and the Division aircraft continually sustain considerable combat damage. The relief of Khe Sanh and the reconnaissance in force in the A Shau Valley highlight this significant aspect.

The impact of proximity to the source of supply and to the fixed base concept has been highlighted by two major moves that the 1st ACD has been required to make. Each of these moves can be compared to a strategic move since the move involved total displacement of the entire supply and maintenance base. During 1967, the 1st ACD operated in the II CTZ from a fixed, developed base at An Khe. Facilities comparable to other aviation units in Vietnam, such as hangers, fixed overhead cranes, and solid hardstand, were available. While there, though slightly below the theatre average, the operational ready rates were acceptable. Since that time, the Division has never had a maintenance base comparable to other units. This is significant in that the design of the Division to be completely airmobile did not envision fixed type bases, whereas other aviation units that support on an area basis were designed to operate from a relatively stable base. This fact must be considered when comparing operational availability rates of Division units with others.

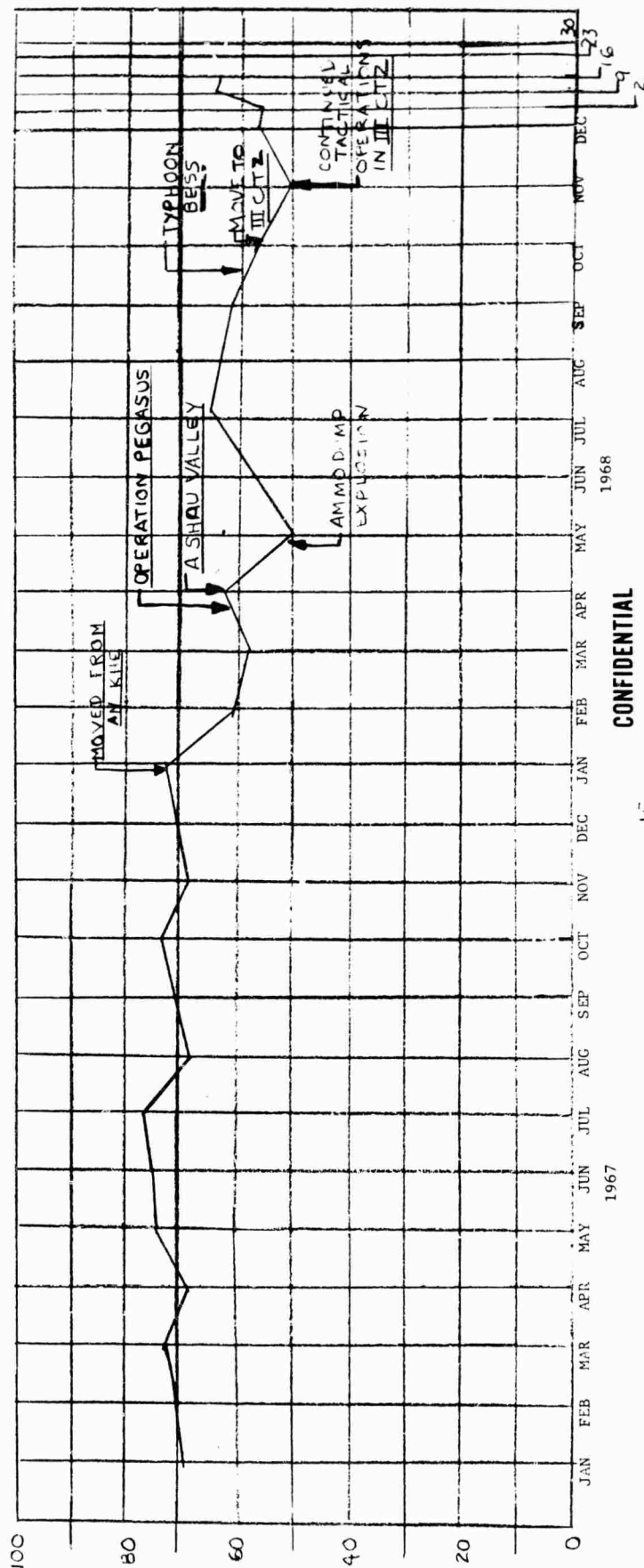
In January 1968, the Division was moved to I Corps. Several things were significant in this move. It moved to the end of the supply line, an ALOC; there were no fixed bases, and only one backup D/S company was available to the Division. The maintenance base consisted of field positions with no shelters of any kind and very little hardstand, and since this move was classified as a "temporary" relocation, assistance normally expected in the form of engineer construction effort and fixed base type materials was not authorized. Efforts by the Division to obtain tent frame type shelters for maintenance were unsuccessful due to such equipment being unavailable in the theatre. In order to obtain equipment dead-lining parts in anywhere near a desirable time frame, the Division was forced to put two men with barracks bags on an airplane every day to fly back to AMMC depots, pick up parts and return. The immediate effect of this move on the operational availability rate and during the ensuing period is self evident from the chart (See Fig. 1, Overall Operational Ready Rate 1967-1968). There was an immediate tremendous drop in daily operational availability of approximately 22%. Though the monthly availability for January 1967 was 72%, a 75% daily level was achieved just prior to the move. By the second week in February, it dropped to daily lows of about 53% for the remainder of the month. Through concentrated effort within the Division, some improvement had been achieved at the end of a nine month period, but the Division was never to regain the level sustained

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OVERALL O/R RATE 1967-1968

1st CAV DIV (AM)



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while in II Corps Tactical Zone.

In October 1968, the Division moved to III Corps Tactical Zone. Several things were significant in the move: it moved closer to the source of supply, a land LOC became the primary means for the movement of supplies to the Division, and there were several backup D/S units available to provide support. However, the maintenance base areas were again far below that available at An Khe, although certainly better than in I CTZ. Locations of maintenance areas had to be based on available space rather than on the most efficient maintenance support and employment of tactical units. A few hanger type shelters were obtained and some hardstand became available, but for the most part, maintenance and supply areas had to be prepared from scratch. Engineer construction support was provided to establish minimum essential requirements only, which consisted primarily of land clearing and preparation, penepriest type hardstand and revetments for aircraft protection. Extensive manhour effort within the Division normally devoted to maintenance had to be expended in further preparation of maintenance and supply areas. An additional factor impacting directly on operational availability was the requirement for conducting combat operations in both I CTZ and III CTZ during the move.

Because of the experience gained in the move from An Khe to I Corps, strong support was provided from nondivisional sources to enhance this new move. In addition to engineer and transportation support, the 34th GSG was directed to provide priority maintenance and supply support at both ends of the move. As a result of this effort and intensive command control and attention within the Division, the drop in operational availability was only approximately 12% as compared to a 22% drop in the move from An Khe to I Corps.

In addition to the impact of the factors outlined above, the 1st ACD frequently has been tasked to provide helicopter support to other US and Free World military forces. This adds to the drain on the unit's already heavily committed assets by requiring the mission to be accomplished with fewer aircraft, thus making management of these resources more difficult.

4. DISCUSSION SUMMARY: a. General: With the establishment of the background information presented above, the study group then focused on the current time frame since the move of the 1st ACD from I CTZ. The study analyzed each of the subject areas outlined in the Scope, and detailed analyses are presented in the attached annexes. Only the most significant aspects of each annex are summarized below.

b. Personnel (See Annex B, Maintenance and Supply Personnel): Detailed examination of the current status of aircraft maintenance and supply personnel in the 1st ACD indicates adequacy in numbers but

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significant shortages in skill levels. In the enlisted supervisory areas, these skill shortages average between 40 and 45% of total authorized. Similarly, 66% of the maintenance warrant officers assigned to the Division are WO1's. The impact on the entire aircraft maintenance and supply system is felt primarily in the areas of knowledge, procedures and proper operation of the supply system. USARV conducts in-country schools in some of the shortage areas which are not MOS producing but can contribute to the raising of skill level within an MOS. Additionally, current OJT programs within the Division will contribute to the raising of skill levels, but shortages of personnel with higher level skills to conduct this training limits the effectiveness of the program. Certain discrepancies exist between the authorization figures used by USARV AG for assignment of supervisory skill levels and those reflected in the 1st ACD (AM) TOE/MTOE. USARV AG is attempting to resolve this discrepancy in order to assure even distribution of theatre assets, but basically, increased input of higher skill levels from CONUS is required.

c. Tools and Special Equipment (See Annex C, Tools and Equipment for A/C Maintenance): There are different degrees of shortages in the three categories of tools and equipment. Although general mechanic's tool sets were in significantly short supply in the past, the current availability has risen to the point where remaining shortages have only minor impact on effective maintenance. The Division has recently received the majority of its special tools, the second category; however, significant shortages still exist in the area of special equipment. Certain specific items such as generators, maintenance shelters, and cranes or wreckers have a serious impact on maintenance effectiveness now, and their absence in the future will not allow the phasing of the Division to the decentralized structure.

d. Supply (See Annex D, Aircraft Supply Support): The impact of the Division's move from I CTZ to III CTZ upon the entire technical supply system became clear as the operational ready rate went down. Extremely short notice and the rapid move directly into heavy tactical operations necessitated minimum planning and preparation and resulted in system disruption. The flow of supplies towards I CTZ had to be reversed and ASL's and PLL's experienced heavy drawdown without replenishment as the move progressed. Expenditure of maintenance manhours towards creation of minimum essential maintenance and supply areas and inventory and rewarehousing of parts on hand contributed to the problem. Through detailed command management within the Division, 34th GSG backup support and heavy reliance on EDP actions, minimum essential aircraft availability was maintained. As previously mentioned, severe shortage of enlisted technical supply supervisors (less than 10% assigned of that authorized) reduced the capability of the Division to reestablish the supply system.

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e. Maintenance (See Annex E, Maintenance Capabilities): During the month of December, the impact of the move to III CTZ on maintenance manhours available was significant. Due to the maintenance manhours required to be expended by the Division in establishing minimum essential maintenance areas in the new location, there was a shortfall of approximately 25% in required versus available manhours. The shortage of aircraft maintenance supervisors, which continues to plague the Division, has a direct effect on the maintenance support. Without the required number of job leaders or foremen, the enlisted leadership is spread thin and productive manhours are lost. This, coupled with the shortage of special equipment and difficult environmental operating conditions, helped to create longer periods of aircraft downtime than would normally be expected. As a result, intensive action at all levels in the 1st ACD to manage and program flying hours required versus necessary scheduled maintenance could not attain the desired results, even with the strong backup support provided by 34th GSG units. Considering maintenance operations as only one factor, the current upward trend in availability evident in January reflects the continuing improvement of maintenance areas and, therefore, the ability of the Division to reapply maintenance manhours to maintenance work.

f. Organization (See Annex F, Organizational Structure): The study group recognized that immediate improvement in the aircraft operational availability will result from actions already discussed. The impact from organizational changes will not be felt for a longer period of time. Accepting the fact that the concept of decentralization had been directed by Department of the Army, the problem was to weigh the advantages to be gained from early implementation in the face of many obstacles. To accomplish an effective changeover even with all resources available, is a monumental task. Advantages to be gained from decentralization are discussed in the Annex. It points up that more responsiveness and higher availability is achieved mainly as a result of efficiency gained from location and control. It is the opinion of the study group that the long range benefits to be gained from the concept of decentralization are such that every effort should be made to move in that direction at the earliest practical time.

The ability to decentralize and the success of it is directly related to the availability of necessary personnel skills, tools and equipment. These requirements are listed in TABS A and B to Annex F. Since the total increase in skills and equipment will not be available at one time, consideration must be given to accomplishing the program on a phased basis, commensurate with the availability of these resources. This must start with the development of a detailed phased plan by the Division which would establish the minimum essential requirements necessary to accomplish the particular phases. Such a plan would recognize the present

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availability of resources and the overriding priorities within the Division.

In order to accomplish any program, it will be necessary to finance the 199 spaces which must be identified before USARPAC will publish the necessary general orders. Early accomplishment of this action by USARV is required as a basis for the requisitioning of certain critical items of equipment and additional personnel.

g. Outlook: It became evident to the study group that there was no single overriding facet responsible for the continued low availability rates within the Division. Accepting the nature of the Division's mission, which incurs the highest rate of combat damage and resultant lower availability, it was apparent that the most traumatic periods in the history of the Division have followed major moves of a strategic nature. Such moves caused the movement of the Division base which required almost a complete cessation of normal maintenance and supply support. The trend in aircraft availability has been reversed and is moving upward. From a low point of 47% on 11 December, it has risen to the present availability of approximately 65%. The factors contributing to this new trend are many but include proximity to the source of supply of parts, receipt of tools long needed, increase in number of mechanics assigned, even though skill levels continue to be a problem, assignment of many new and rebuilt replacement aircraft allowing turn in of old aircraft for extensive rebuild, availability of extensive backup support and continuing emphasis on aircraft control and utilization at all levels of command within the Division. It is expected that the availability rate will stabilize at the current level for a period of time and can then continue upward as shortages in special equipment and appropriate skills become available.

5. CONCLUSIONS: a. Although the total number of aircraft maintenance officers, warrant officers and enlisted men assigned to the Division is currently adequate, there continue to be significant shortages in the higher skill levels, specifically in higher grade warrant officers and enlisted maintenance and supply supervisors. Certain in-country schools and current OJT programs within the Division provide a means for some upgrading of skill levels; however, the experience required in the higher level supervisors must be met by input from CONUS.

b. Although there have been serious shortages of general and special tools, the current level of availability based on recent issues meets minimum requirements.

c. Critical shortages in certain items of special equipment, such as cranes and compressors, still exist and cause longer downtime per aircraft, thus reducing availability.

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d. The disruption of the maintenance supply system and procedures caused by the move of the Division from I CTZ to III CTZ coupled with the shortage of technical supply supervisors had a direct impact on the operational ready rate.

e. Heavy drawdown on ASL's and PLL's within the Division during the move have caused them to be inadequate. Current proximity to supply sources and shortened LOC's will assist the Division in its current drive to replenish stocks.

f. Maintenance manhours required to be expended in support of the Division move caused a shortfall in available versus required manhours for maintenance work. The continuing shortage of skilled maintenance supervisory personnel and certain items of special equipment aggravated this shortage. The combination of these factors was a major cause of longer downtime per aircraft in scheduled maintenance, thereby hampering unit level management of aviation assets.

g. Sufficient advantages accrue from the decentralized maintenance concept to warrant implementation at the earliest practical time.

h. Successful accomplishment of the decentralized concept is dependent on the availability of necessary resources.

i. In view of the current shortages of skills and equipment and the limited input, decentralization can best be accomplished in a phased program adjusted to the input.

j. Financing of the 199 spaces to support the decentralization is necessary before any action can be initiated to publish general orders which are required to justify resources.

6. RECOMMENDATIONS: It is recommended that:

a. USARV Officer and Enlisted Assignments Branches review existing assignment policies and procedures to insure that an equitable distribution of experience and skill levels of maintenance and supply personnel is made.

b. The 1st ACD request and USARV grant additional school quotas based on immediate needs. A program be developed to anticipate future requirements to permit timely submission of requests for increased allocation of school quotas.

c. A training program directed at critically short skill areas be developed within the Division utilizing technical assistance personnel assigned to the Division to alleviate instructor shortages.

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d. ACofS, G4, USARV request appropriate CONUS agencies to expedite procurement and delivery of the special equipment items as listed in TAB A, Annex C and to provide necessary equipment to support the decentralized concept as listed in TAB B to Annex F.

e. Action already initiated to improve and update the PLL's and ASL's of the 1st ACD be continued.

f. The required procedures be established by the Division to insure proper preparation and editing of requisitions.

g. 34th GSG continue to provide, through their DSU's, backup maintenance support to the Division.

h. The financing of the 199 spaces required to support the decentralized maintenance concept be given top priority by USARV and the necessary general orders issued.

i. CG, 1st ACD develop a detailed phased plan for the implementation of the decentralized concept which delineates by phase the minimum essential skills and equipment necessary for accomplishment of each phase.

j. CG, USARV authorize priority to the 1st ACD of assignment of necessary skills and issue of required equipment as developed in the detailed plan.

SHEDD
BG, USA

Annexes: ~~A - Administrative~~ Annex A wd Hq DA
B - Maintenance and Supply Personnel
C - Tools and Equipment for A/C Maintenance
D - Aircraft Supply Support
E - Maintenance Capabilities
F - Organizational Structure

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ANNEX B

TO

STUDY OF AIRCRAFT OPERATIONAL READY RATES IN 1ST CAVALRY DIVISION (AM)

Maintenance and Supply Personnel

1. PROBLEM: To determine the adequacy of the number and skill level of aircraft maintenance and supply personnel within the 1st ACD.

2. DISCUSSION: a. Data was acquired to provide a basis for the study of the adequacy of total numbers, skills and skill levels of aviation maintenance and supply personnel within the 1st ACD. For purposes of a comparison, the same data relating to personnel of the 1st Aviation Brigade was collected. The G1 section, 1st ACD and the AG section, 1st Avn Bde provided statistics on TOE authorizations and current assigned strengths. USARV AG, Officer and Enlisted Assignment Branches, provided comparison figures on the same data and information on the methods used to make assignments of personnel to the major field commands in the theatre. Data on the schools and training portion of this study were obtained from the USARV Aviation Section (OPT), the G3 section, 1st ACD, and from the Operations and Plans Division, 34th GSG.

b. The total number of aircraft maintenance officers assigned to the Division compares favorably with the number authorized by TOE. A comparison of maintenance officers assigned to the 1st ACD with those assigned to the 1st Aviation Brigade shows a relatively equal distribution of grades. (See TAB A)

c. The 1st ACD has a 93% fill of TOE authorized aircraft maintenance warrant officers. A comparison of the maintenance warrant officer grade structure between the 1st ACD and the 1st Avn Bde indicates that the 1st Avn Bde has a higher percentage of the upper grade warrant officers. (See TAB A)

d. The total number of enlisted aircraft maintenance and supply personnel assigned exceeds the total TOE authorization. An analysis of enlisted skills reveals shortages existing in the maintenance supervisory areas (67Z50, 67N40), technical inspectors (67W20), technical supply supervisors (76T40), OH-6A crew chiefs (67V20), aircraft component repair personnel (68F,H) and aircraft armament repairmen (45J20). An attempt was made to obtain data on the percentage of requisitions filled for these critically short skills and skill levels during the last six months in order to determine trends and establish a basis for projecting future fill. The data required to establish such trends would have to be obtained by research of daily assignment logs for the period in question. This was not considered to be feasible within the time frame requirements

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of the study. Projections of input to the theatre are derived from a comparison of requisitions against projected AIT output. This is only a gross calculation in view of the fact that there are non-USARV demands placed against this output. More significant and of direct impact on this study is the ability to project the input of the higher skill level NCO's. There is no valid way to project the availability to USARV of this skill level. Figures were obtained from the USARV AG section in order to make a comparison of MOS shortages in the 1st ACD with those of USARV aviation organizations. The figures indicated no disparity in the assignment of personnel by basic maintenance MOS. Further study of comparative assignment by skill level with each basic maintenance MOS revealed that inequities existed in certain higher skill levels. A direct comparison of skill levels was made between the 1st ACD and the 1st Avn Bde to illustrate this. (See TAB B) A review of the authorization figures used by USARV AG Enlisted Assignments Branch as a basis for making assignments in the upper skill levels revealed that certain discrepancies exist. For example, the figures provided USARV AG by USARPAC show the 1st ACD authorized 59 UH-1 maintenance supervisors (67N40) while the actual TOE/MTOE used by the Division reflects a total authorization of 119. USARV AG is attempting to resolve this discrepancy.

e. USARV schools are available for three of the areas considered critical (45J, 67V, 76T). These schools (Army Aviation Refresher Training Schools) are not MOS producing but serve in conjunction with unit OJT programs to provide a foundation for the development of skills and conversion of non-critical MOS personnel to the critical MOS fields. The AARTS courses are operated for the USARV Aviation Section by the 34th GSG. Quotas are allocated quarterly to the major field commands on the basis of aircraft density, letter requests, special requests and previous utilization of assigned quotas. Letter requests for increased quotas must be made with sufficient lead time to permit adjustment of the quarterly allocation prior to publication. Special requests for additional quotas after publication of the quarterly allocations are more difficult to fill.

f. On-the-job training programs are in progress in both organizational and direct support maintenance sections within the Division. This program is hindered by the shortage of qualified aircraft maintenance and supply supervisors. Formalized training conducted by technical assistance personnel assigned to the direct support maintenance units has been conducted in the past and offers a possibility of alleviating some of the existing skill shortages.

3. CONCLUSIONS: a. There is a sufficient number of aircraft maintenance officers assigned to the Division, and the grade structure is comparable to other USARV aviation organizations.

b. There is a sufficient number of aircraft maintenance warrant officers assigned to the Division. The ratio of higher grade warrant officers is lower than in comparable USARV aviation organizations.

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c. The total number of enlisted maintenance and supply personnel assigned to the Division is adequate. Shortages exist in several skill areas (67V20, 67W20, 68F,H). Significant shortages exist in the maintenance and supply supervisory skill areas (67Z50, 67N40, 76T40). A discrepancy exists between the authorization figures used by USARV AG to make assignments in the supervisory skill levels and those reflected in the TOE/MTOE used by the 1st ACD. Information on input available to the USARV AG is too general to permit development of a projected fill in the specific skills and skill levels.

d. Formal schools are available for training in some of the critically short MOS areas. Quotas above the normal allocations can be obtained if timely requests are submitted with sufficient justification.

e. The shortage of maintenance and supply supervisory personnel reduces the effectiveness of the OJT program. Increased utilization of assigned technical assistance personnel to conduct formal schooling within the Division can reduce some existing skill shortages.

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Study of Aircraft Operational Ready Rates in 1st Cavalry Division (AM)

TAB A to Annex B

Status of A/C Maintenance Officers and Warrant Officers, 1st Cav Div (AM) and 1st Aviation Brigade

	<u>1st Cav Div (AM)</u>			<u>1st Avn Bde</u>		
	<u>AUTH</u>	<u>ASG</u>	<u>STATUS</u>	<u>AUTH</u>	<u>ASG</u>	<u>STATUS</u>
OFF	61	66	+5	127	126	-1
WO	60	56	-4	138	148	+10

Distribution of Officers/Warrant Officers by Grade

(Figures do not consider 30, 60 or 90 day losses)

	<u>1st Cav Div (AM)</u>	<u>1st Avn Bde</u>
LTC	6%	2%
MAJ	30%	28%
CPT	20%	28%
LT	44%	42%
CW4	4%	2%
CW3	15%	24%
CW2	15%	29%
WO1	66%	45%

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Study of Aircraft Operational Ready Rates in 1st Cavalry Division (AM)

TAB B to Annex B

Critical MOS Shortages as of 29 Dec 68

(Figures do not consider 30, 60 or 90 day losses)

<u>MOS</u>	<u>% Short 1st Cav Div (AM)</u>	<u>% Short 1st Avn Bde</u>
45J20* (Acft Armament Rpmn)	39.5	42.4
67N40 (UH-1 Maint Supvr)	44.5	20.2
67V20* (OH-6 Hel Rpmn)	53.2	5.5
67W20 (Hel Tech Insptr)	30.0	4.2
67Z50 (Acft Maint Supvr)	44.9	0.0
68F20 (Acft Electrician)	28.9	47.5
68F30 (Sr Acft Electrician)	43.7	0.0
68H20 (Acft Hydraulic Rpmn)	43.7	8.1
76T40 (Acft Repair Prts Supvr)	94.4	30.8

*USARV schools available.

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ANNEX C

TO

STUDY OF AIRCRAFT OPERATIONAL READY RATES IN 1ST CAVALRY DIVISION (AM)

Tools and Equipment for A/C Maintenance

1. PROBLEM: To determine the level of availability of tools and special equipment for aircraft maintenance within the Division and their impact on aircraft operational ready status.

2. DISCUSSION: a. Data collected from the 1st ACD for the purpose of this study consists of the TOE authorizations for tools and special equipment, that actually on hand, items on requisition and commanders' comments as to those items that they consider critical. Personal contact was made with all 1st ACD aviation units to verify current posture of these items. The 34th GSG provided a comparative analysis, by line item and quantity, of requisition posture for tools and special tools of the 1st ACD as compared to the rest of USARV. Availability of special equipment was obtained from 1st Log Command. The data studied was subdivided for analysis into three major areas: general tools, special tools, and special equipment.

b. In the area of general tools, only general mechanic's tool sets were in significant shortage, approximately 38%. The reason for this shortage has been the absence in the theatre supply system of G/M Tool Kits. The supply posture has improved over the past three months, resulting in the current 1st ACD G/M Tool Kit fill level, and requisitions are presently being filled to bring the 1st ACD to its authorized level.

c. The availability of special tools was examined and a comparative analysis made of those authorized versus those on hand. Special tools shortages were found to represent an insignificant percentage of total authorizations. Outstanding 1st ACD requisitions for special tools also indicate that the 1st ACD has the majority of its current requirements.

d. Special equipment shortages (See TAB A) that are of significant impact are found in the areas of generators, compressors, maintenance shelters and cranes. Generator shortages approximate 60% of the total authorized. By type generator, the shortages span from 45% to 80% with the predominant shortages in the larger KW sizes. Data provided by 1st Log Command indicates critical theatre shortages in the larger KW sizes and a considerable lead time requirement for the others. The only exception was 5 KW generators, which 1st Log Command indicated were presently on hand. Compressors are in a more precarious position with shortages approximating 90% of authorizations. Of the three types authorized, one is at 0% fill. Of the three types on requisition, only a limited quantity

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of one type is on hand within 1st Log Command. The maintenance shelters issued in October to the 1st ACD under the ENSURE program were received incomplete. 1st Log Command indicates that replacement components are on hand and coordination is being made for their issue. With regard to cranes, the percentage of shortage is 50%, which represents 4 cranes of the 8 total authorized. The major reason for this shortage is the absence in the supply system of the M60 Anthony Crane. The acceptable substitute is the 5 ton crane M62/63. 1st Log Command reports a zero balance for 5 ton cranes with an anticipated delivery date of May 1969. The status of tools and equipment related to the decentralized organization for maintenance and supply is continued in Annex F.

5. CONCLUSIONS: It is concluded that:

a. The level of availability of general tools is sufficient within the 1st ACD.

b. The level of availability of special tools is sufficient within the 1st ACD.

c. The level of availability of special equipment is inadequate, particularly at the DSU level. The resultant impact of the special equipment shortages, with regard to aircraft operational ready rate, is not measurable, but it does result in a longer downtime per aircraft.

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Study of Aircraft Operational Ready Rates in 1st Cavalry Division (AM)

TAB A to Annex C

Critical Shortages

<u>FSN</u>	<u>NOUN</u>	<u>AUTH</u>	<u>ON HAND</u>
4310-542-4111	Compressor	32	0
4310-764-2316	Compressor	40	16
4310-630-7969	Compressor	8	1
6115-889-1446	Generator	48	17
6115-577-3400	Generator	60	31
6115-017-8239	Generator	23	11
6115-511-2210	Generator	20	4
6115-075-1641	Generator	32	12
6115-548-1377	Generator	34	0
3810-002-3882	Crane, 3T M60	8	4

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ANNEX D

TO

STUDY OF AIRCRAFT OPERATIONAL READY RATES IN 1ST CAVALRY DIVISION (AM)

Aircraft Supply Support

1. **PURPOSE:** To examine the aircraft supply support in the 1st ACD to determine those steps which can be taken to increase the daily operational ready rate of aircraft in the Division.

2. **DISCUSSION:** a. In conducting the study, the following actions were taken:

(1) An analysis was made of supply performance data provided by the Division and by the Aviation Material Management Center (AMMC).

(2) A review was made of a report of inspections conducted by the Division in December 1968.

(3) Visits were made to elements of the 15th Transportation Battalion and to selected aviation elements.

b. The ASL's and PLL's are considered inadequate as most of the demand accommodation rates are below the 85% considered necessary to properly support maintenance operations. The average ASL demand accommodation for the DSU's was 74% in November and 71% in December. The average PLL demand accommodation for those units surveyed was 30% in November and 20% in December.

c. AMMC data indicates that a number of requisitions received from the Division were improperly prepared or edited. Approximately 8% of all of the requisitions submitted by the Division were rejected due to errors that could not be corrected by AMMC. This rate, while similar to the USARV average, is considered excessive. Experience has shown that units can significantly reduce their error rate through improved preparation and edit procedures.

d. The Division has a shortage of qualified Technical Supply Personnel, especially supervisors. Based on the 29 December PDS report, 1 of 18 authorized 76T40 (Aircraft Repair Parts Supervisor) and 79 of 97 authorized 76T20 (Aircraft Repair Parts Specialist) were assigned. (See Annex B, Maintenance and Supply Personnel) This shortage has significantly contributed to the deficiencies in supply procedures currently existing in the Division.

e. Analysis of the NORS rates for November and December indicates

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that they are in line with USARV standards and that there are no significant fluctuations. (See TAB A) This indicates that supply support was adequate to maintain the desired aircraft operational ready rate. However, attainment of low rates was partly due to parts acquisition by extensive lateral search, controlled cannibalization, and the use of the EDP priority. (During December, the Division submitted 6.8 EDP's per aircraft compared to the USARV average of 5.6 EDP's per aircraft.) Increased availability of parts on the shelf as the result of adequate ASL's, PLL's, accurate requisition preparation/editing, etc., would reduce the resources expended for lateral search and controlled cannibalization. Maintenance resources expended resolving supply problems through controlled cannibalization have a direct impact upon the maintenance manhours available for normal maintenance functions. (See Annex E, Maintenance Capabilities)

f. The move of the Division to the III CTZ had a significant impact upon the technical supply operations in the Division. The lack of adequate planning and preparation time precluded units from taking actions which would have reduced the time required to restore operations to normal in the new location. The lack of sufficient and adequately packaged CONEX's plus the rough handling normally associated with a move of this type required that a complete location survey and inventory be conducted upon arrival in III Corps. In many cases, complete rewarehousing was required. In addition to the manhours expended in correcting this situation, requests for parts which were on hand but could not be located had to be forwarded to AMMC. This increased the length of time that the operating unit PLL's were kept at a low stock level and increased the need for the use of EDP priority requisitions. Additionally, although actions were taken by AMMC to redirect supply shipments, those parts already in the transportation system could not be diverted and had to be trans-shipped from I Corps to III Corps, causing a delay in filling replenishment requirements. During the time that the DSU's were not operational only EDP requisitions were being processed by 34th GSG DSU's. During this same time, replenishment requisitions were backlogged and parts receipts were stockpiled awaiting commencement of DSU operations. The combination of the requirements to rewarehouse, receive stockpiled supplies and process backlogged requests placed a major workload on the DSU's upon arrival in their new location. This was magnified by the concurrent requirement for the units to establish their new base of operations and support heavy tactical operations.

g. The colocation of the Division DSU's with those of the 34th GSG has assisted immeasurably in the reestablishment of the Division's technical supply posture. Lateral search for critical EDP items as well as the relatively easy access to the Saigon depot over truck routes are just two examples of how location has contributed to the current improving trend.

3. CONCLUSIONS: a. The following deficiencies in supply support have contributed to the relatively low daily operational ready rate of aircraft of the Division:

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- (1) Inadequate PLL's and ASL's.
 - (2) Inaccurate editing of requisitions.
 - (3) The shortage of qualified Technical Supply Personnel within the Division.
- b. The move of the Division to III Corps had an adverse impact upon the Division aircraft technical supply operations.

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Study of Aircraft Operational Ready Rates in 1st Cavalry Division (AM)

TAB A to Annex D

<u>NORS RATE</u>						
<u>TYPE A/C</u>	<u>STANDARD</u>	<u>NOV</u>	<u>30 Nov 6 Dec</u>	<u>7 Dec 13 Dec</u>	<u>14 Dec 20 Dec</u>	<u>21 Dec 27 Dec</u>
OH-6A	10	4.5	9	8	10	3
AH-1G	10	5.4	4	5	6	4
UH-1B	5	1.7				
UH-1C	8	1.0				
UH-1D	5	3.9	2	1	4	5
UH-1H	5	3.0				
CH-47A	10	2.2	3	6	2	3
CH-47B	10	1.0				

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ANNEX E

TO

STUDY OF AIRCRAFT OPERATIONAL READY RATES IN 1ST CAVALRY DIVISION (AM)

Maintenance Capabilities

1. PROBLEM: To analyze the maintenance capabilities of the 1st ACD versus that required to support the Flying Hour Rate Base.
2. ASSUMPTIONS: The DA Form 1352 reported Flying Hours accomplished for the month of December 1968 is representative and can be considered to be a typical Flying Hour Rate Base.
3. DISCUSSION:
 - a. General: In order to analyze the aircraft maintenance capabilities of the Division, consideration must be given to aircraft maintenance manhours required, available and utilized. In addition, other factors, such as skill levels available, tools and equipment shortages, combat damage maintenance requirements and disruptions encountered by Division moves, must be considered. It was decided to use maintenance manhours as a common denominator, considering the impact of the other factors.
 - b. Aircraft maintenance manhours required versus available and utilized:
 - (1) Using the formulation and factors contained in FM 101-20, the maintenance manhours required to support the December flying hour program were calculated to be 149,367 and 63,392 for OM and DS, respectively. Additionally, 5141 manhours were expended on combat damage repairs at DS level. Based on these considerations, the total effort required to support the December flying hours was 217,900 manhours.
 - (2) Based on the average assigned strength and 180 hours per man per month, the organizational and direct support maintenance manhour capabilities were approximately 228,800 and 124,700 respectively (FM 101-20 CAT I Unit). A 1st ACD study showed that approximately 36% of the overall capability was not available due to necessary leave, R&R, guard and other administrative duties. Accordingly, the total maintenance manhours available for the month of December was approximately 226,200.
 - (3) Maintenance manhours expended (TAB A) were 101,205 and 62,298 for OM and DS, respectively, for a total of 163,503 manhours. The difference between available manhours and expended manhours was that required to be utilized on continuing preparation of minimum essential maintenance and supply areas to include relocation of supplies and equipment into these areas. This will continue to affect the maintenance posture of the Division on a decreasing scale until such time as the aviation units and direct support companies are adequately established.

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(4) The 1st ACD aircraft availability for the month of December was approximately 57 percent which was 15 percent below the DA standard of 72 (all aircraft included). Coincidentally, the ratio of the two availabilities was approximately the same as the ratio of the total manhours expended to the manhours required to maintain the DA standard, i.e. 57/72 approximates 171,500 (includes 8,000 34th GSG MH)/217,900. Though the relationship is not linear, it is reasonable to conclude that the deficit between manhours required and manhours expended had a substantial impact on the December aircraft availability. The increased availability evident during the month of January 1969 is in part indicative of stability being restored to maintenance operations and the backup support rendered by the 34th GSG. The current 12th PMP trade-out between the 1st ACD and the 34th GSG has assisted the Division in its successful efforts to increase CH-47 availability. Continuation of this support will further assist in establishing stability in the aircraft availability rates in the 1st ACD.

c. Skill levels: An analysis of the aircraft mechanic skill levels authorized and assigned indicates a significant shortage in MOS skill level digit 40 and 50 (Aircraft Maintenance Supervisor). (See Annex B, Maintenance and Supply Personnel) It is felt that this leadership shortage has an immeasurable but serious effect upon the maximum utilization of skills and manhours available.

d. Tools and equipment: (1) The availability of common and special tools has improved sufficiently so that it no longer has a significant impact on the maintenance capability (See Annex C, Tools and Equipment for A/C Maintenance).

(2) The shortage of special equipment, particularly at DSU level, has resulted in loss of productive manhours and has extended the downtime per aircraft (See Annex C, Tools and Equipment for A/C Maintenance) An example would be the time lost in locating, obtaining and transporting a crane or wrecker for the purpose of changing aircraft major components.

e. Environment: The environment in which organizational maintenance was performed precluded the maximum utilization of maintenance manhours available. This was especially true at Quan Loi and Phouc Vinh where the tactical situation and the proximity of aircraft to harassing fires made it necessary to maintain light discipline within many of the maintenance areas. Attempts have been made since August 1968 to provide maintenance shelters to aviation units in the 1st ACD even though shelters are not authorized by TOE. Shelters would significantly improve the capability of units to perform maintenance at night while maintaining a reasonable degree of light discipline. An ENSURE shipment of 23 shelters was received in part while the Division was located at Camp Evans. However, these were incomplete and shortages are still outstanding which preclude the construction of even a partial shelter.

f. Programming of F/H for scheduled maintenance: Evidence examined indicated that extensive effort was being made to program flying hours by

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aircraft tail number to minimize the downtime of aircraft for maintenance. However, downtime in the Direct Support Maintenance over that anticipated, due partially to loss of productive maintenance manhours as discussed above, hampered this effort. As a result, the mission requirements were performed with fewer aircraft which further compressed the scheduled maintenance requirements. Along with the unscheduled maintenance and battle damage, this caused additional drop in aircraft availability, which further reduced the capability for management of assets.

g. 34th GSG support: During the period under study, the 34th GSG provided approximately 8,000 manhours of maintenance support. In addition, during the period of the Division relocation, the 34th GSG provided Direct Support maintenance while the 15th TC Bn was non-operational. It was found that this support could be provided the Division with negligible effect upon the normal support provided to other 34th GSG customer units. At the present time, 34th GSG units working in close coordination with 1st Avn Bde units, are accepting aircraft requiring extensive maintenance, even though it is still within the owning unit's maintenance capabilities. The suggested criteria for a candidate under this program is 500 maintenance manhours required for repair or an estimated 15 days of downtime. **The program allows the owning unit to devote its available maintenance manhours to fast turn around maintenance requirements and should, in the long run, reduce the deferred maintenance on the fleet.** This same program should be extended to the Division. The amount of maintenance support provided under this program will be determined by the maintenance manhours available in the 34th GSG DSU and by coordination between the 34th GSG DSU's and the Divisional DSU's.

4. CONCLUSIONS: a. Maintenance manhours utilized in December were less than the manhours required to support the rate base because a substantial number of maintenance manhours were required to be expended in establishing operations in this AO.

b. There was a shortage of qualified maintenance supervisory personnel in the 1st ACD.

c. A shortage of certain special equipment resulted in some loss of manhours available.

d. The capability of performing support maintenance was reduced by requirements for maintaining light discipline.

e. Longer downtime caused by the above factors, especially in scheduled maintenance, hampered unit level management of aviation assets.

f. Additional maintenance manhours can be provided by the 34th GSG to assist the Division DSU's during peak loads.

Study of Aircraft Operational Ready Rates
in 1st Cavalry Division (AM)

TAB A to Annex E

A/C Density-Hrs Flown-Support Hrs Req, Asg and Utilized

TYPE AC	NR O/H	HRS FLOWN	O R G A N I Z A T I O N A L					D I R E C T S U P P O R T				
			MH/FH FACTOR	MH REQ	MH ASG	MH UTILIZED	TOE AUTH	MH/FH FACTOR	MH REQ	MH ASG	MH UTILIZED	TOE AUTH
OH-6A	84	5,000	2.5	12,500				1.19	5,950			
UH-1B	6	174	5.8	1,009				2.10	365			
UH-1C	6	277	5.8	1,608				2.10	582			
UH-1D/H	174	12,724	5.8	73,799				2.10	26,720			
AH-1G	83	4,949	5.8	28,704				2.10	10,393			
CH-47	50	2,387	13.3	31,747				8.12	19,382			
TOTALS: 403	25,511			149,367	228,780	101,205	190,620		63,392	117,540	55,098	140,400
						M/H Provided by			Civ Augm.			
									7,200			
						M/H Provided by			34th GSG			
									8,000			
						Combat			Damage			
									5141			
						Totals:			68,533			
									124,740			
									70,298			
									140,400			

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ANNEX F

TO

STUDY OF AIRCRAFT OPERATIONAL READY RATES IN 1ST CAVALRY DIVISION (AM)

Organizational Structure

1. PROBLEM: Determine the impact of the organizational structure of the 1st ACD on aircraft availability.

2. ASSUMPTIONS: a. Mission requirements of the Division will directly affect the flying hours to be performed.

b. Adequate manhours to perform the aircraft maintenance mission in 1st ACD are authorized in decentralized MTOE's.

c. Aircraft damage rates will not change significantly.

3. FACTS BEARING ON THE PROBLEM: a. The Department of the Army has directed the reorganization of 1st ACD to the decentralized concept of aircraft maintenance.

b. The present tactical requirements will require that all three maneuver brigades be fully committed to accomplish the 1st ACD mission for the foreseeable future.

c. The present geographical area of operations of the 1st ACD is larger by (comparison) about three times than the previous AO, which requires increased blade time on Division aircraft to accomplish the Division mission.

d. USARV Aircraft Damage Analysis Fact Sheet concludes that 1st ACD sustained the highest combat damage rate of units sampled during a six month period.

4. DISCUSSION: a. In view of the fact that the Chief of Staff had approved the concept of decentralized maintenance, the study group did not evaluate the advantages of it versus centralization. The problem was to evaluate those factors which will affect the timing of implementation to weigh the advantages to be gained from early implementation.

b. The present organizational structure of the Division was designed to support the Division in combat with two of the three brigades fully committed. This envisaged operation from a fixed Division base. As indicated earlier in the study, the Division has never operated in this manner but has operated in three widely separated areas from time to time. This has placed extreme demands on the supporting D/S units.

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Though the D/S battalion is organized to provide teams to accompany supported units into the field, these teams are limited in equipment and capacity when away from the basic company.

c. The maintenance concept in support of Division aircraft required that aircraft requiring an excess of 24 hours to complete be passed to the Division's Direct Support (D.S.) companies. In order to impose the least burden on organizational level maintenance, scheduled inspection requirements were modified. The most important change was to the 100 hour periodic inspection where inspection requirements have been adjusted downward. To compensate for this adjustment, the 300 hour periodic inspection, which is performed at D.S. level, has been made more comprehensive. This is a departure from normal maintenance allocation charts. Additionally, the D.S. concept relieved the supported units of some work normally considered an organizational maintenance function. The D.S. battalion is manned and equipped, when at full TO&E, to accomplish 85% of the entire D.S. function. It should follow that backup D.S. must be provided to the Division at 15% of the total requirement to accomplish the entire workload. The D.S. battalion is organized to provide teams to accompany supported units into the field. The teams perform all possible D.S. maintenance in the operating area to reduce downtime for evacuation back to the D.S. company.

d. A Department of the Army staff analysis of studies conducted on centralized versus decentralized maintenance concepts concluded that more responsiveness and higher availability is achieved under decentralization. This is mainly achieved as a result of efficiency gained from location and centralization. It specifically concluded that "...the detachment concept of providing operating units with the personnel, tools, and equipment to perform all phases of preventive and special maintenance inspections, component replacement and a more extensive avionics, airframe and component repair capability was superior to other concepts now in use in Vietnam for the following reasons: (1) The detachment concept produced consistently higher readiness rates, (10%) more than the other concepts... (2) The differential on operational readiness rates can be attributed to the maintenance support concept, as NORS rates were essentially the same under each of the concepts... (3) The detachment concept provided a higher rate of responsiveness. The rate at which aircraft were returned to service the same day they went in was higher under the detachment concept than under the other concepts studied... (4) The detachments accomplished a higher total percentage of all support level work than the other support concepts. Detachments accomplished approximately 90% of all support level workload, as compared to slightly more than 82% for the other concepts."

e. The planned decentralized concept calls for 19 D.S. detachments attached to the supported troop/battery/company and under the command control of the supported unit, plus a two company Direct Support Maintenance and Supply Battalion. The tools and equipment are increased as well as personnel, all tailored to the needs of the supported unit. This proposed organization requires an increase of 199 personnel in the Division at full MTOE strength and the action required to authorize the

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spaces to finance this requirement is now pending at USARV.

f. The effect on mobility of the Division is not conclusive. Under the present centralized maintenance concept, a tactical move of the 1st ACD or of any sizable force requires the movement and relocation of one or more D.S. companies. Each company requires movement plans for a total of 319 personnel plus all equipment and supply on hand to maintain direct support maintenance on relocation. This type of movement requires a complete shut down of both maintenance and supply at point of origin. At destination, it would normally take approximately 15 days to begin production and a significantly longer period of time to reach the desired level of productivity. The 15 days would include erection of maintenance shelters, relocation of machine and special tools, relocation of tech supply line items in the mobile containers, as well as realignment of countless records, files and registers. Under the decentralized D.S. concept, although the movement of the 1st ACD or of a sizable task force would also involve requirements in relocating as many detachments as tactical aviation units deployed, each detachment moves at the same time its parent unit moves. Only 40 to 60 personnel and a reduced amount of equipment and supply are relocated compared to the D.S. company, thereby requiring much less time for each detachment to become operational and productive.

g. The available comparative data on flying time required for the Division to perform the assigned mission is inclosed as TAB A. The periods covered compare movement of the entire Division between tactical corps while sustaining combat operations during the move. Entry into a new AO in both cases has increased the combat loss and damage rate of the Division during the early phases of operations. The data available indicates that a significant increase in flying hours will be required to sustain operations in the present III Corps AO. This is extremely important as this increase in flying hours must be supported by better and more responsive aircraft maintenance and supply.

h. The present centralized concept requires 1428 personnel while the decentralized concept requires 1627. At full strength, the personnel required for centralized maintenance is 88% of those required for decentralization. The present shortages as discussed in Annex B show that too many critical skill level shortages would exist to change to the decentralized concept without significant increases.

i. Information available within USARV indicates that the additional shop and tool kits to support the decentralized concept will become available for shipment o/a 15 March 1969 under existing priority. A review of other MTOE line items of equipment indicates that some are already in theatre short supply and projected availability is vague or unknown. The exact status of availability of critical items is shown at TAB B. Until these items are made available in sufficient quantity to meet each phase of decentralization, the concept cannot be implemented.

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j. Repair parts total inventory levels are higher under the decentralized concept. This method will improve the density of repair parts in 1st ACD and position them so as to be more responsive to the needs of the supported unit. ASL's with demand experience for decentralized detachments are available in 1st Avn Bde and should be used as a basis to establish ASL's for 1st ACD units.

5. CONCLUSIONS: a. Sufficient advantages accrue from the decentralized maintenance concept to warrant implementation at the earliest practical time.

b. Successful accomplishment of the decentralized concept is dependent on the availability of necessary resources.

c. In view of the current shortages of skills and equipment and the limited input, decentralization can best be accomplished in a phased program adjusted to the input.

d. Financing of the 199 spaces to support the decentralization is necessary before any action can be initiated to publish general orders which are required to justify resources.

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Study of Aircraft Operational Ready Rates in 1st Cavalry Division (AM)

TAB A to Annex F

Aircraft Availability Comparative Data

	<u>#ASG</u>	<u>NORS</u>	<u>NORFM</u>	<u>NOROM</u>	<u>F/H</u>	<u>O/R</u>
Jan 68	249	3.0	14.1	6.4	14,710	76.5
Feb 68	433	5.7	21.5	8.8	18,211	63.9
Mar 68	301	6.7	25.4	7.4	15,801	60.5
Totals & Ave:	327	5.1	20.2	7.5	38,722* (45,633)	66.9
Oct 68	432	4.7	22.5	13.7	22,174	59.1
Nov 68	418	2.8	25.6	13.0	24,398	59.5
Dec 68	411				25,511	57.0
Totals & Ave:	420				72,083	58.5

Sources: Jan 68--Mar 68, AVDAC data
Oct 68--Dec 68, 1st ACD DA Form 1352

*Some aircraft are not reported in Jan 68 and Mar 68. Feb 68 data is considered valid so the differences are added to the period total (38,722 + 6911 hrs). 45,633 hrs for Jan 68--Mar 68 is considered a more realistic figure.

AVEGD-SP

SUBJECT: Request for Equipment Status

TO Aviation Officer

FROM ACoFS, G4

DATE

CMT 2

MAJ Bialkowski/ak/4645

ATTN: AVHAV-OPT

Equipment status is as follows:

a. Generator Set 30KW/60HZ - There is a critical shortage of these generators in country. Programmed shipments will not satisfy existing TOE/TDA shortages let alone support new requirements.

b. Generator Set 7.5KW/28Volt - Item must be requisitioned from CONUS based on an approved TOE/TDA.

c. Generator Set 5KW/60HZ - Available.

d. Generator Set 45KW/60HZ - This item is being eliminated from the supply system and will be replaced by either a 30KW/60HZ or 60KW/60HZ pending CDC evaluation of requirements. As a result, all procurement has been terminated. There are no assets available in USARV or CONUS to support this requirement.

e. Forklift, 3,000 lb RT - This item is no longer being procured for USARV. It will be replaced by the 4,000 lb Clark-Ranger forklift now being obtained under the ENSURE program. These units are programmed to fill existing TOE shortages in the air-mobile divisions under their present configuration. Therefore, assets will not be available to support this requirement unless the add-on ENSURE is extended. Projected availability is 6 - 9 months.

f. Wrecker, 5-Ton - Wreckers are not now available. Projected availability is late May.

g. Light Set, 25 Outlet - Available.

h. Flood Light Set - Not available. No projection as to availability.

i. Tent, Maintenance - 40 complete tents are on-hand and available for issue.


j. Shelter Electronic Shop - Not available. No projection as to availability.

k. Transporter, Airmobile - Not available. No projection as to availability.

1 Incl
nc

W. M. HALZS, JR.
Colonel, GS
ACoFS, G4

"A TRUE COPY"


ALBERT NEWTON
COL TC

DISPOSITION FORM

(AR 340-15)

REFERENCE OR OFFICE SYMBOL

AVHAV-OPT

SUBJECT

Request for Equipment Status

TO G4

FROM Deputy Aviation Officer DATE

CMT 1

LTC Dickinson/jjb/4597

A study is being conducted on the de-centralized aviation maintenance concept for the 1st Cavalry Division (Airmobile). This program includes the activation of 19 separate direct support maintenance teams. The availability of equipment to provision these nineteen teams will influence the time frame in which this plan can be accomplished. Attached is a list of critical items of equipment that are considered essential to the operations of each team. Request the current status of in-country assets of these items or the forecasted availability dates.

1 Incl
as

ALBERT NEWTON
COL, TC
Deputy Aviation Officer

45

DA FORM 2496
1 FEB 62

REPLACES DD FORM 96, EXISTING SUPPLIES OF WHICH WILL BE
ISSUED AND USED UNTIL 1 FEB 63 UNLESS SOONER EXHAUSTED.

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<u>FSN</u>	<u>Description</u>	<u>Number Required</u>
6115-738-6342	Generator, 30 KW	38
6115-511-2210	Generator, 7.5 KW	19
6115-702-3347	Generator, 45 KW	4
6115-017-8240	Generator, 5 KW	30
3930-950-9985	Forklift, 3000 lb	15
2330-902-3474	Transporter, Airmobile	79
2320-835-8343	Wrecker, 5 Ton	19
8340-951-6419	Tent, Maintenance	38
4940-877-8726	Shelter, Electronic shop	35
6230-299-5642	Flood light set	20
4920-900-8378	Shelter, Airmobile	21
6230-299-7077	Light set	20

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DEPARTMENT OF THE ARMY
HEADQUARTERS 1ST CAVALRY DIVISION ARTILLERY (AIRMOBILE)
APO San Francisco 96490

AVDAAR-CO

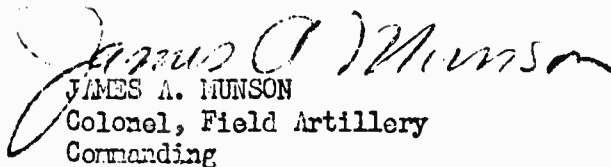
5 April 1969

SUBJECT: Coordinated Employment of Fire Support Means (U)

SEE DISTRIBUTION

1. Attached for information and reference is a copy of a recent study conducted to describe and discuss the capabilities and techniques for coordinated employment of combinations of the fire support means available to the 1st Cavalry Division (Airmobile).

2. Although the study was not approved for dissemination as Divisional policy/guidance, it is being provided to maneuver and fire support commanders alike because it contains background and detail supporting guidance papers being distributed separately. The study also may be of interest in that it introduces certain subjects which will be analyzed in greater detail by subsequent study groups. Finally, the study might be useful as orientation reading for newly assigned officers or as review material for the more experienced.


JAMES A. MUNSON
Colonel, Field Artillery
Commanding

DISTRIBUTION:

3 ea - G3
3 ea - G2
1 ea - G5
6 ea - 1st Bde
6 ea - 2d Bde
6 ea - 3d Bde
20 ea - Div Arty
5 ea - 1/9 Cav
5 ea - 11 Avn Gp
3 ea - Div PLO

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Incl 2

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COORDINATED EMPLOYMENT OF FIRE SUPPORT MEANS (U)

1. Purpose: To describe and discuss the capabilities and techniques for coordinated employment of combinations of fire support means available to the 1st Cavalry Division (Airmobile).
2. Scope: The study will provide:
 - a. Part I: Principal Considerations Influencing Selection of Weapons Systems (U).
 - b. Part II: Considerations for Sequential and/or Simultaneous Employment of Fire Support Means (U).
 - c. Part III: Major problem areas in selecting and coordinating fire support means (U).
 - d. Part IV: The elements of "orchestrated" delivery. (U)
 - e. Part V: Conclusions and recommendations. (U)
 - f. Annex A: Design Capabilities and Limitations of Individual Fire Support Means (C).

I. Principal Considerations Influencing Selection of Weapons Systems.

1. Before discussing the elements essential for coordinated employment of the varied fire support means available to a maneuver commander it is advisable to review the principal considerations which influence the selection of weapons systems. Such a review could provide the maneuver commander with a better appreciation of the results a weapons system could achieve during a given tactical situation. Skillful selection of the best possible weapons system, or combination of systems, is essential for maximum effectiveness in a given tactical situation. When ground contact is made with the enemy, response time may dictate the fire support employed initially (organic mortars and direct support artillery). The maneuver commander, after making as accurate and thorough an assessment of the situation as time limitations permit, then could request the type of fires indicated by his assessment, planned scheme of maneuver, and the advice of his artillery liaison officer. The headquarters controlling fire support assets must consider the total requirements of the command, the total available assets, and the priorities of all fire support requests submitted for action -- as well as the factors discussed in the following paragraphs. The ultimate goal of the coordination of all fire support means should be the delivery of an appropriate volume of fire in a minimum amount of time without jeopardizing either ground forces or fire support means.

2. Considerations:

a. Volume and type of fire received: The ground commander whose unit is in contact with an enemy force can estimate the size of the concealed force opposing him by the volume and type of fire his unit is receiving. Once he estimates the size of the force engaged, he then can determine the probable width and depth of this force (or target area), the probable number and disposition of targets therein and the necessity for non-organic fires.

b. Troop protection: The cover of both the friendly and enemy forces must be considered. Cover may vary from small folds in the ground, which offer some protection from direct small arms fire but not to indirect fire and fragments, to bunkers with extensive overhead cover. Fire support weapons must be selected giving regard to cover if the enemy is to be neutralized with minimal risk to friendly troops. For example, if enemy cover is maximized, divisional weapons may be inadequate and heavy artillery or TAC Air may be required to destroy their cover.

c. Proximity and orientation of forces: The distance between friendly and enemy dispositions often will favor the employment of certain fire support means and eliminate others for the attack of the enemy's forward elements. Delivery accuracy coupled with bursting radius must be considered in order to prevent casualties among friendly elements by our own fire support. The orientation of the friendly elements also will affect weapons

selection. For example, if friendly and enemy forces are in close contact and the friendly disposition is along the gun-target line of a supporting artillery unit, this unit should be rejected in favor of another unit, or another fire support means, which could fire parallel to the friendly front. This is true because for most fire support means, the probable error in range is greater than in deflection. Troop safety distances for each weapons system are primarily a function of probable error (in range or deflection) and radius of effect. They strongly influence weapon selection and delivery point and might cause a given weapon system to be rejected because troop safety would require the friendly force to "bounce back" and possibly lose contact. The tactical situation may dictate closer than prescribed employment of specific fire support means--in which case the maneuver commander must choose the best course of action. It is his unfortunate dilemma to decide whether the value of the fire support he wants warrants the casualties his own force might suffer in the emergency he confronts.

d. Size and shape of engagement area: Early determination of the size and shape of the target is of prime importance in the attack of bunkers and fortified areas. Air observation (1/9 Cav, Bde Scouts) may be required at the outset since ground reconnaissance is limited frequently by terrain considerations. The target definition will assist the ground commander in evaluating which elements of fire power to request and their sequence of employment under varying tactical situations. Determination of the approximate limits of the area occupied by an enemy force will influence selection of the appropriate weapons system, or systems, with which to engage. If the enemy occupies a relatively small area, weapons which have less dispersion are more desirable; whereas a large occupied area would permit less attention to this characteristic. The fact that the enemy occupies a relatively small area also may preclude the simultaneous employment of several weapons systems because of congestion. The terminal effects characteristic of the larger weapons systems may cause casualties outside a relatively small enemy area. Larger enemy occupied areas, conversely, permit employment, consecutively or simultaneously, of two or more appropriate weapons systems. Attack by the individual systems either may be dispersed throughout the area or superimposed upon each other depending upon target vulnerability, systems delivery error, and ordnance bursting radius. Larger areas may also favor employment of Air Cavalry to secure a portion of the area, to operate on the flanks or rear of friendly enemy positions, or to assist in blocking enemy escape.

e. Capability to reinforce: When a decision to reinforce has been made, it becomes a factor to consider in fire support selection. If the unit in contact is opposed by a greatly superior force and is to be reinforced in place, close fire support may be required in order to fix the enemy and to protect friendly elements until reinforcements arrive. However, if friendly elements are not threatened gravely and quick reinforcement is planned, close fire support may be reserved until reinforcement

has been effected; then used to destroy the resistance. If the reinforcement is to be effected by a CA, consideration must be given to coordination of air space and to fire support for the air landing as well as for the attack. The distance between the friendly elements and the reinforcing unit becomes significant as the reinforcing unit is closing with the friendly element. If the reinforcing unit is closing with the enemy between it and the friendly elements, heavy destructive ordnance must be employed on the enemy position before the two friendly units get so close together that minimum safe distance requirements and control problems prohibit its use.

f. Ability to identify friendly locations with accuracy: The ability of a commander to locate friendly elements in his TAOR will affect his choice and use of fire support. In Vietnam, friendly elements are moving much of the time and often lack overhead protective cover. In such situations, the commander might require an additional safety margin between friendly positions and ordnance delivery points. In any event it is mandatory that location of friendly elements be provided to the fire support agency.

g. Ability to maneuver: If the unit in contact retains the ability to maneuver, the application of maneuver to the situation may accomplish the desired end with less assistance from supporting fire. Once a unit has become decisively engaged, the principal means remaining to influence the action is to apply additional fire. In order to maintain the momentum of an attack which is moving rapidly, the use of an aerial delivery system in which the individual who fires the weapon has visual contact with the advancing troops, or their mark, may be advantageous.

h. Weather: Visibility and ceilings can affect the delivery and observation of certain types of fire support. Indirect fire weapons are least affected by weather, whereas armed helicopters and TAC Air are inhibited greatly by low ceiling and poor visibility. Weather factors that will influence ordnance delivery by air are turbulence (weapons accuracy may be inhibited if moderate or severe), visibility restrictions such as haze, fog, smoke, and rain (target identification is increasingly difficult as visibility decreases less than two miles), and ceilings (increased aircraft vulnerability and decreased accuracy will occur when ceilings lower). Generally TAC Air can operate at ceilings of 3000 feet or greater, and ARA or Air Cavalry can operate at ceilings of 1500 feet or greater. Darkness also will inhibit support by ARA, TAC Air, and Air Cavalry. The identification of friendly locations usually takes from ten to fifteen minutes longer at night than in day. Since distances from the air appear shorter at night than in the day, close fire support is difficult to attain with aircraft. Defensive concentrations and final protective fires should be considered first during the hours of darkness.

i. Terrain: The type of terrain in which an engagement occurs will have varying effects on almost all weapons systems; including both their

delivery means and ballistic effects. For the purpose of this discussion two categories of terrain will be considered: flat vs mountainous, and open vs thick vegetation. Flat terrain poses virtually no additional problems for the weapons systems under discussion. Mountainous terrain, on the other hand, may be a limiting factor for all weapons systems--depending upon the altitude of the mountains, their gradient and their relative locations. Mortars and high angle artillery fire may be required to attack targets in valleys or on reverse slopes. Both fixed and rotary wing aircraft encounter increased difficulties in approaching a target and in maneuvering as the ruggedness of the terrain increases. The presence of vegetation within an area of engagement also may affect the selection of an appropriate weapons system. As the vegetation density increases, both surface and air bursts produce less effect on the ground. The problem of target location also increases, reducing the effectiveness of weapons systems dependent upon visual target acquisition for delivery accuracy.

j. Availability: In considering the availability of various fire support means, the commander is concerned with both the immediate requirement and the possible requirement for sustained support. Mortars and cannon artillery ordinarily can be put on the target promptly and often will be used to meet the immediate requirement until a possibly more discriminating selection is available. Sometimes a pre-planned air-strike may be immediately available for diversion to the contact area, but the decision to divert it should include the consideration of the maximum time on station of the fighters. Some time will be required for the FAC to arrive on station, identify the friendly positions, and mark the target. This delay may exceed the fighter's maximum time on station, causing the air strike to be lost. Generally speaking, mortars and cannon artillery can sustain fire support better than other systems. They are limited only by the availability of ammunition at the firing positions, the ASR, the ability to resupply, and the rate of fire of the weapon. Sustained support by air delivered weapons will vary depending upon the number of flights available, the priority of the target, and the maximum station time of each flight.

II. Considerations for Sequential and/or Simultaneous Employment of Fire Support Means (U).

1. Individual weapons systems not only must be selected to support the force commander's scheme of maneuver, they must also be coordinated and controlled carefully in order to achieve their full effectiveness. Simultaneous employment of fire support systems discussed within this study is possible to the extent that certain minimal requirements of the respective systems are met.
2. Simultaneous employment of cannon artillery and aerial rocket artillery:

a. These two systems can engage the same target or adjacent targets simultaneously. If ARA knows the gun-target line, it can choose a direction of attack which will not take the helicopter across the gun-target line and which will permit it to break without entering the danger zone created by the howitzer fire. The possible cases are indicated in the following sketch. Howitzer targets are indicated by "H" and ARA targets by "ARA."

	H		ARA
H-ARA	ARA	H	ARA-H
(Safe for ARA	(Safe for ARA atk.	(Safe for ARA atk.	(Safe for ARA
atk. from right)	from either side)	from either side)*	atk. from left)

Friendly Positions.

Howitzers

* However, this target ordinarily should be attacked with ARA firing on the portion nearest friendly positions and howitzers firing the more distant targets.

b. One important exception to the foregoing occurs when friendly dispositions dictate a direction of attack in order for ARA fires to be safe against a close-in target. If the dictated direction puts the ARA approach within about 30 degrees of the gun-target line, cannon artillery should check fire or shift to another area.

c. It must be recognized that more than one mortar or cannon artillery unit may be firing into a given area, and that more than one maneuver element may be located within the danger area. These considerations further will limit the choice of ARA direction of attack and will increase the instances in which some or all cannon artillery must check fire.

d. CVT fuzes should not be fired by cannon artillery in the vicinity of helicopters due to the high reflectivity of whirling rotor blades and the lack of data as to the possibility of the CVT fuze activating.

e. Coordination:

(1) Both cannon artillery and aerial artillery must be controlled by the same agent on the artillery fire control net.

(2) The artillery controller must apprise the aerial artillery section leader of the tactical situation, cannon artillery targets being fired and their gun-target lines, and a recommended direction of attack.

(3) The ARA pilot must be free to reject the direction of attack given by the artillery controller, propose a new direction of attack, and request that cannon artillery check fire if, in his judgment, such action is necessary for the safety of his aircraft and of friendly forces.

(4) Night Operations:

(a) The artillery controller must control cannon illumination in a manner which provides safety for aerial artillery rocket runs.

(b) The ARA section must be advised of the canister trajectory for the illumination round.

(c) The artillery controller must adjust illumination height of burst as requested by aircraft in the area to avoid pilot night blindness.

3. Simultaneous employment of aerial artillery and tactical air.

a. Visibility must be more than four (4) miles along the respective flight paths and pilots must gain visual contact with each other.

b. A target area at least 750 meters wide is used for USAF planning of flight paths. From 750 meters to 1000 meters, fighters and ARA must make alternating passes. Beyond 1000 meters simultaneous passes are

acceptable. (With good visibility, experienced pilots, well defined targets, and clearly marked friendly lines, strikes may be brought closer to friendly forces if, in FAC/pilot judgment, troop safety can be preserved.) ARA rocket runs and fighter passes within the same general attack area are preferably made on parallel or near parallel courses.

c. Aerial artillery and close air support must not be used simultaneously at night within three (3) miles of each other.

d. There must be a communication link, either direct or indirect, between the aerial artillery section and the forward air controller (normally through the C & C ships).

4. Simultaneous employment of aerial artillery and air cavalry.

a. Aerial artillery and air cavalry habitually work simultaneously during the same engagement. They must maintain airspace separation.

b. A communication link, either direct or indirect, must be established. This link normally will be through the C & C ship.

5. Simultaneous employment of cannon artillery and air cavalry.

a. The most acceptable situation for air cavalry and cannon artillery to operate simultaneously is for the air cavalry to fly on either side of the gun-target line. Without anti-aircraft fire the air cavalry target altitude will be 1000 feet and below. Then the air cavalry, if necessary, can operate under that portion of the artillery trajectory which exceeds 1000 feet. With an anti-aircraft threat, the air cavalry will operate approximately at an altitude of 2000 feet and, if necessary, will fly under that portion of the artillery trajectory which exceeds 2000 feet.

b. The air cavalry must operate away from the artillery impact point by at least four (4) PER's plus the bursting radius of the caliber of cannon artillery being employed, if they are operating on the gun target line.

c. CVT fuzes should not be fired by cannon artillery if the air cavalry is on or near the gun-target line.

d. Coordination:

(1) The artillery controller must provide the air cavalry with artillery information through the communications link in the C & C ship.

(2) The air cavalry should request cannon artillery over the supported unit NCS and adjust it on a designated artillery net.

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6. (C) Simultaneous employment of TAC Air and Cannon Artillery:

a. Due to variations of air delivery methods, if the fighter final approach path is near the gun-target line, the maximum ordinate of the artillery round should be equal to or less than the release altitude of the fighter. However, an increase in the lateral separation between the gun-target line and the final approach path would allow the use of a higher maximum ordinate for the artillery. (There is no statistical data available to determine the minimum safe separation distance between artillery trajectories and fighter flight paths).

b. The most desirable final approach path for a fighter is perpendicular to the gun-target line, with the fighter target beyond the artillery point of impact. If perpendicular or near perpendicular delivery is not possible, the final approach path should be approximately parallel to and in the same direction as the gun-target line.

c. Separation distance between the artillery target and the fighter target should be at least 750 meters. This distance may be reduced if, in the judgment of the pilot, the fighter armament, target identification, stability of the gun-target line, and other factors permit. One danger in having the two close together is that smoke from the artillery rounds could be mistaken by the fighter pilot for a FAC identification mark.

d. Coordination:

(1) Simultaneous employment will increase the time required to deliver fighter ordnance due to the required additional briefing of the fighter pilots by the FAC.

(2) Cannon artillery and FAC have a common communications link through infantry NCS and the artillery liaison section at the infantry battalion TOC for coordination purposes.

e. Spooky:

(1) The technique for employment of Spooky is to fly a circular path at an altitude of 3000-3500 feet over the target area. The diameter of the flight path depends upon the size of the target area, and for purposes of safety, the maximum ordinate of cannon artillery must be 2500 feet or less.

(2) The artillery target and the Spooky target can be identical if the above requirement is met.

(3) An easing of the restrictions, in (1) above, would seem to be feasible in certain cases where the Spooky flight path need not pass near the artillery maximum ordinate.

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7. Simultaneous Employment of Air Cavalry and Tactical Air:

a. Air Cavalry and Tactical Air can function simultaneously under most conditions. Through a communication link, the air cavalry will acquire and identify (mark) specific targets. The FAC passes target information received from air cavalry teams to fighters and directs their expenditure. As the mission progresses, the FAC can hold fighters high while the air cavalry checks the target to determine whether the target must be hit again or a shift should be made to a new target. Timing for this operation will be accomplished by coordination between team leader and FAC.

b. Limited air space over the target area may restrict accomplishment of a joint mission.

c. Enemy air defense weapons and air space used by other friendly fire support systems also can interfere with simultaneous employment.

8. Simultaneous employment of cannon artillery, aerial artillery and Tactical Air:

a. The preceding factors governing employment of these weapons systems still apply.

b. Because both aerial systems are affected by the artillery gun-target line, it may be necessary for one of the two to adopt a less desirable procedure if simultaneity is to be achieved. ARA may have to make its break from rocket runs earlier than otherwise desirable and toward the guns. Fighters may have to make final approaches parallel to the gun-target line and toward the artillery target.

c. In most cases, however, absolute simultaneity by the two attacking aerial systems will not be required. Instead, alternating passes may be employed using either identical or parallel flight paths from separate orbiting stations.

d. Targets for each of the three systems must be identified positively by tactical air and ARA.

9. Simultaneous employment of MEDEVAC and fire support means:

a. TAC Air should be restricted to cannon and rocket fire in the vicinity of the LZ. If bombing is necessary, the minimum safe distance (MSD) for unprotected personnel should be used.

b. If cannon artillery is firing in proximity to the LZ, the MSD for unprotected personnel will apply. Consideration must also be given to the relationship between gun-target line and MEDEVAC flight path. If cannon artillery must "check fire," due to proximity of bursts to the LZ, the

check fire should be effected only long enough for MEDEVAC to make its final approach and departure. Artillery may be shifted to a target farther from the LZ until extraction is completed.

10. Simultaneous employment of PSYOPS and fire support means:

a. Simultaneous employment of PSYOP and fire support means refers primarily to their employment on an alternating basis during a period of time. The alternating use of fire and psychological persuasion can be very effective in causing the surrender of enemy soldiers.

b. PSYOP aircraft should normally be introduced over a contact area during lulls in firing. PSYOP loudspeaker aircraft normally orbit an enemy target in circles about 1000 - 2000 mtrs in diameter. They fly at about 1500 feet altitude in daylight and 800 ft at night. For leaflet drops, PSYOP aircraft may offset their orbits several hundred meters in the direction from which the wind is blowing. If time does not permit orbiting, PSYOP aircraft can deliver a short message while making a straight-line pass.

c. Coordination:

(1) Close coordination is necessary between supported units, fire support means, and PSYOP aerial or ground teams, not only to promote safety and proper delivery of ordnance, but to coordinate the timing of fire and PSYOP on the enemy, and to prevent violation of the PSYOP surrender terms by friendly fire.

(2) When PSYOP and fire support means are supporting a ground unit, they should be controlled by the ground unit NCS or C&C aircraft.

(3) When PSYOP and fire support means are operating together without a ground unit, they should use a prearranged communications link.

III. Major problem areas in selecting and coordinating fire support means .

1. Four areas are considered to be particularly important in terms of the problems presented to achieve effective and coordinated fire support. In one of them--the attack of bunker complexes--the selection of appropriate weapons systems is of primary concern. In the others--massing firepower, obtaining clearances to fire and operating the artillery warning system--the obstacles encountered impact principally upon the effort to coordinate the firepower selected for delivery.

2. Attack of bunker complexes: Three general approaches were considered with respect to the selection of weapons for attack of bunker complexes:

a. Destruction of successive bunkers by precision attack.

b. Destruction of an area of bunkers by massive attack.

c. Forcing enemy personnel out of bunkers, killing them, and then inserting friendly forces into the area and destroying the position.

3. A prerequisite for precision destruction of bunkers is the ability to locate the target precisely and to observe the fire placed upon it. The Army has weapons which can destroy bunkers--8 inch howitzers, recoilless rifles, LAW and others. But jungle growth and camouflage often prohibit precise location of targets except by observation from distances so short that they are often impossible to reach against active enemy resistance. The first requirement therefore is to destroy that which conceals the bunkers. Air attack by bomb and napalm is the most effective means quickly available to accomplish this. Once this attack is completed, those bunkers exposed to observation but not yet destroyed can be attacked by using precision weapons. Longer term methods should also be considered: namely the Rome Flare and defoliants. Within the Division's area of operations there are extensive areas of jungle which are unoccupied and which make little or no direct contribution to the national livelihood. Leveling or defoliating specific areas with known bunker complexes would seem to be justified, and it would facilitate precision attack of the bunkers as well as future ground operations into the area.

4. Attack of bunker complexes by very heavy artillery is the most effective means of area destruction currently available. Use of this means should be continued, but its limitations should be recognized. Arc lights are expensive in resources, are not available in sufficient quantity to meet division needs, are incapable of destroying all bunkers with an area, and hence permit enemy reentry and reconstruction of base areas. This latter aspect suggests the need for prompt ground follow-up, not only to clear the area of remnants of the enemy force and to provide full assessment of the damage inflicted, but also to complete the destruction of enemy installations and, if advantageous, to deny re-entry by use of such weapons as persistent CS, mines and booby traps.

5. A final method considered for attacking bunker complexes requires weapons which can force the enemy into the open and then kill him; thus permitting entry by maneuver forces to clean up the resistance and destroy the facilities. A key weapon in this type attack is non-persistent CS to force the enemy into the open. To penetrate heavy canopy and to cover the areas commonly housing bunker complexes, volume delivery is necessary. USAF can deliver CS in quantity but preplanning is required in order to attach the delivery apparatus to aircraft. Since pre-planned chemical attacks often are subject to abort because of unfavorable weather conditions and higher priority aircraft missions, the USAF may not be able to earmark aircraft for CS missions. In any event, once CS has been delivered into the target area, the next problem is placing effective fires on the enemy forced into the open. Mortars and cannon artillery are ordinarily suitable for this task, either by themselves or in conjunction with ARA or air strikes. The attack by fire should be quick and heavy in order to permit maneuver forces to enter the area promptly and take full advantage of shock and confusion within the enemy force.

6. Each of the type attacks against bunker complexes described in the preceding paragraphs can be effective. The CS attack, in terms of available resources and potential effectiveness, seems particularly to merit a full trial. Apparently it has not yet been tested thoroughly by forces in combat, at least within the 1st Cavalry Division, and such testing might reveal a degree of utility meriting frequent employment.

7. Massing fire power: Implicit in much of what has been said to this point is that fire support can be more effective if delivered in greater volume over a shorter period of time than is often the case in our current operations. Too much of our artillery firepower is expended in two-round night attacks of suspect enemy locations, 5 or 10 minute preparations fired by platoons rather than shorter preparations by batteries, and reconnaissance by fire with single rounds being pumped out ahead of a moving column (inflicting little damage while marking the progress of our movement for the enemy). Our present brigade commanders express little confidence that these fires inflict many casualties or greatly impede enemy movement. The first one or two volleys of artillery produce the most kills, because thereafter the enemy has taken full advantage of available protection. If artillery volleys were more massive and less numerous, greater effect probably could be achieved with given expenditure of ammunition. Put another way, the Division should to the full extent possible, hit worthwhile targets with as many rounds and as many with more tubes, avoid splitting batteries, reduce reconnaissance by fire, increase observed fires, and limit planned fires to those targets where intelligence is sufficiently strong to give reasonable expectation of injuring the enemy.

8. Obtaining political/military clearances: The process of obtaining clearances is sometimes complex and difficult, and often is the governing factor in determining reaction time for various fire support means. It can

by itself disrupt an otherwise well conceived and coordinated fire support plan. An example of the delay clearance requirements have imposed is given in Annex A. Although the fire support means in the table is cannon artillery, other weapons systems are susceptible to similar delays.

9. The requirement for acquiring clearances prior to attacking in a given area exists for all fire support means. Some targets may have to be cleared by several different agencies to include the parent artillery battalion (safety check of firing data), adjacent US/FWTF forces, GVN political headquarters, ARVN headquarters, and agencies controlling or advising CIDG, RF, PF, et. al. The number of non-division units within and on the boundaries of the division AO, and the presence of friendly population centers complicates the process of clearance. Generally speaking, the closer the AO is to urban areas, the more complex the clearance situation becomes and more numerous are the "no-fire areas" which are established to protect hamlets and areas in which the populace is working.

10. The problem of obtaining clearances is one which requires understanding by both the supported and the supporting commander. Both must know the Rules of Engagement in order fully to use such freedom of action as these rules provide. Both must recognize that on occasion their requests for clearance simply will not be granted, because adjacent troop safety or political considerations will be determined as overriding their military requirement. The two must communicate fully with each other so that the supporting commander understands the needs of the supported, and the latter understands the limitations upon the former's freedom of action. Both must recognize they have a joint responsibility for clearances; for sometimes the rank and prestige of the supported commander can solve a clearance problem which the diligent efforts but lesser weight of the supporting commander have been unable to crack.

11. Obtaining proper clearances promptly is not insurmountable--in most cases. Upon initial occupation of an AO and until the local clearing agencies become familiar with the operations, communications channels, and procedures of the Division (within a week or two normally), clearance times may significantly exceed the two or three minutes which should be attainable in non-contradictory cases. Some actions which can be taken to achieve this level of performance are:

a. Upon receipt of a new AO, the representative from the DS artillery battalion should visit all US/FWTF and GVN political headquarters operating in or adjacent to the new AO to confirm boundaries, no-fire areas, and clearance procedures. It is advisable that the artillery representative be accompanied by a representative from the supported Brigade to ensure mutual understanding of procedures and possible problem areas.

b. Although not proscribed by existing policies, the DS Artillery Battalion often may facilitate clearance by establishing direct communications with the agency or agencies with whom it must deal. The DS Artillery Battalion should establish a direct radio/telephone link with the DS

Artillery supporting adjacent US/FWTF Forces. In some instances it will be necessary to establish a liaison section at a center where several clearance agencies are co-located. The fewer the agencies a DS Artillery Battalion must go through to obtain a clearance, the shorter will be the time required.

c. Continued coordination and discussion of problem areas with GVN political/military headquarters (District and/or Province) sometimes will succeed in broadening blanket clearances, reducing no-fire areas, and lessening time required to obtain clearances.

d. With CIDG, RF, or PF elements operating within the Brigade AO, clearance problems are often particularly time consuming and persistent. In these cases especially, the Brigade should exercise its influence in an effort to contain RVN elements within a defined area of operations (thereby confining the clearance problem to one area) or to absorb them into Brigade operations.

e. In some cases it may be possible to coordinate in advance for blanket clearances, covering forthcoming operations.

f. When establishing an AO or AO extension, clearance will be facilitated if an abundant area is obtained. During recent Brigade operations within the Michelin area, for example, it was necessary to obtain external clearance for almost every fire mission within the AO extension because the area was so small that most targets were within 1000 meters of a boundary. Partial relief could also be furnished in another form--namely by reducing the boundary clearance requirement from 1000 meters to a lesser distance (II FFV is said to be considering 500 meters as an alternative). This would provide some assistance to the AO around LZ Lil, for example, which is presently so small that all fires fall within 100 meters of the boundary.

g. Another measure which might be taken, preferably at FFV or MACV level, is to have no-fire zones updated. Several instances have been encountered recently in which no-fire zones on maps used by GVN authorities are drawn around hamlets which no longer are occupied.

12. There is general recognition by all clearance agencies that troops in contact must receive fire support as soon as possible. Therefore, when troops are in contact, only the most critical criteria for clearance need be met. The existence of contact sometimes is a question of judgment which the maneuver force commander must answer in order for clearance to be obtained. Once contact is deemed to exist, friendly forces should continue to be free to deliver fires within the immediate area--even though hostile fire has ceased--so long as the maneuver commander can reasonably conclude that the enemy force remains in the area and friendly fires will not fall on friendly population.

13. Artillery Warning System. The requirement to post firing data with and to receive permission to fire from an AWCC may sometimes delay delivery of fires though problems in this case are not nearly as frequent as in obtaining political/military clearance. The time required will be lengthened if a Brigade AO lies within more than one AWCC area of responsibility.

14. One of two procedures for warning aircraft applies to each mission handled by an AWCC. Depending upon the mission of the aircraft, the pilot may be directed to route his aircraft around the fire mission, or the mortars and cannon artillery may be told to check fire until aircraft passes through the hazard area. Electronic target acquisition/surveillance aircraft constitute a particular problem in this regard in that they may require imposition of a check fire on non-contact fire missions for periods up to three hours over large portions of a brigade AO. An additional persistent complication for AWCC's is that aircraft over an AO often are on missions for the Air Force, higher US Army headquarters, RVN agencies, or other non-divisional commands and the AWCC has little basis for evaluating their importance and the acceptability of delaying their progress.

15. There are some practices which can reduce AWCC clearance problems.

a. Blanket clearances often can be obtained for one or more quadrants around fire bases for specified periods at night.

b. The brigade S-2 should keep the DS Artillery Battalion informed of the schedules for aerial surveillance within the AO. Priority of surveillance flights vs fire missions can often be established in advance through brigade S-2/S-3 coordination, thus avoiding clearance delays and criticisms which may otherwise occur if the AWCC is forced to make decisions on such questions.

c. AWCC's often can determine the minimum altitude at which surveillance aircraft will fly and clear artillery fire with maximum ordnates below this altitude.

d. Whenever an AO lies within more than one AWCC, efforts should be made to change AWCC boundaries so that the entire AO will fall under a single center.

IV. The Elements of "Orchestrated" Delivery

1. Examination of the characteristics of the various weapons systems and the problems arising in their use establishes that the systems can, in most cases, be used simultaneously or in close succession for the attack of a given target area. "Orchestrated" employment, however, cannot be achieved simply by issuing and processing calls for fire expeditiously as the need arises. The essential ingredients are:

a. Knowledge of the capabilities and delivery techniques of the various systems.

b. "Backward planning"

c. Centralized control

2. With regard to the first point, above, this study includes considerable information regarding weapon capabilities and delivery techniques. However, both time and available reference data were insufficient to compile what seems to be needed: extracts of tabular data condensed into an easily used reference for fire support planning. This data must be in considerable detail and include such things as troop safety distances for all the many types of munitions, graphs of trajectories of all caliber of artillery and all charges, planning factors for determining response times of the various weapons systems, etc. Unless such data is readily at hand, the unit staff frequently will not have time to plan in sufficient detail to assure synchronized, effective and safe delivery of fire power upon the enemy. It should be noted that some of the necessary reference data seems simply not to be in existence. Minimum safe distances between ARA and Tac Air in a bomb run is one example; the effect of rotating helicopter blades on CVT fuzes is another; and the study group encountered voids regarding many other such details. To the extent that this study offers data in those instances, it has ordinarily drawn upon individual judgment and experience gained in Vietnam. These judgments seem sometimes to be conservative and to provide undue troop safety, but, since no real test data is available, adoption of less restrictive provisions appears to be risky.

3. The objectives of fire support in many of the situations confronting the Division in its present AO is to provide an appropriate mass of fire power upon an area target in a minimum period of time. Compression of the time period for delivery of fire requires backward planning. The maneuver commander first sets the time when he wants each weapons system to strike its target. In doing so, he must consider the battlefield with which he is dealing (artillery gun-target lines, disposition of friendly troops, target sectors suitable for various weapons, etc.) in order to determine when and how each of the fire support means can be employed without interfering with the other. By subtracting response times, he can arrive at a schedule for calling each system into action.

4. For effective execution of the attack, the schedule is only a reference. The key element is a cool and knowledgeable maneuver battalion commander, flanked by his S-3 and artillery liaison officer, airborne in a C&C ship which provides communication with the commander on the ground, the supporting artillery, Tac Air, and ARA. The commander directs and the others advise and react: calling in the fire support on schedule, steering the MEDEVAC to a pickup point along a course which will not interrupt the flight, shifting fires as targets of opportunity appear, and perhaps most important, exercising control over the airspace. At any time during the course of battle it is possible that the C&C helicopter, ARA sections, Air Cavalry Team, a FAC with his fighters, MEDEVAC, and assorted other aircraft will be on station. Congestion and mutual interference will inevitably result if there is no central figure in control. Such congestion of important air space, results in the mandatory cessation of fire support in order to avoid striking aircraft and delays to the point that aerial fire support may be lost completely as time on station is consumed without ordnance being delivered.

Section V. Conclusions and Recommendations.

1. Conclusions:

a. The characteristics of fire support systems permit their simultaneous employment in most situations.

b. Ordinarily fire support is most effective in inflicting shock and destruction when it is applied in volume over a short period of time.

c. Orchestrated employment of fire support and maneuver can be achieved only when key individuals in the combined arms team possess ready knowledge of the capabilities and limitations of elements of their force, plan for their coordinated employment, and direct the operation from a single command and control facility.

d. The most troublesome threat to coordinated employment of our forces, once the conditions in paragraph "C" (above) are satisfied, is failure to obtain clearances to fire. This problem can never be eliminated completely, and it can be minimized only through the common efforts and mutual understanding of both the supported and supporting force commanders.

e. The problem of weapons selection particularly is difficult for the attack of bunker systems. A number of effective weapons exist, but each has its limitations and none eliminates the ultimate necessity for infantry to enter the area and root out the remaining enemy. The use of non-persistent CS followed by a killing artillery and air attack prior to the infantry assault appears to be worth a full combat evaluation within the division.

2. Recommendations:

a. That as combat opportunities arise, the maneuver battalions test the capability and effectiveness of concerted employment of weapons systems appropriate to the situations they confront.

b. That while various fire support combinations may be used in a given situation, it be recognized that the appropriateness and necessity for these combinations remain the decision of the tactical commander, with the advice of his fire support representative.

c. That extracted tabular data be compiled for reference in fire support planning.

d. That defoliation and Romo plow projects be undertaken against selected portions of enemy routes of movement through the Division AO.

e. That an operational test be undertaken against an enemy bunker area employing USAF delivered non-persistent CS, followed by air and artillery

explosives and ground follow-up.

f. That fire support planning place increased emphasis upon massed fires and reduced emphasis upon the number of targets.

g. That concentrated effort be made to reduce the time required for clearing fires by:

(1) Aggressive artillery battalion/cavalry brigade action to reduce no-fire areas and to obtain prior clearances for planned operations.

(2) 1st Cavalry Division (Airmobile) advocating II FFV action to reduce the clearance requirement from 1000 meters to 500 meters on either side of a boundary.

(3) Obtaining AO's and AO extensions or fire support boxes of sufficient size to minimize the need for outside clearance in a given operation.

(4) Proposing an ARVN/US advisor review of no-fire zones throughout the II FFV area, specifically seeking to eliminate those no-fire areas now existing ground unoccupied villages and to reduce buffer areas surrounding legitimate no-fire zones.

(5) Proposing to II FFV a change in the Rules of Engagement which would permit attack within populated areas against a clearly identified point target from which hostile fire is falling upon friendly forces. Weapons to be used in response would be the most accurate and discriminating available to the commander.

(6) Furnishing guidance to AO commanders on the interpretation of the term "troops in contact." The proposed guidance would permit the commander once fired upon, to return fire against the area in which enemy activity occurred as long as he reasonably estimates that the enemy force remains within the area (even though no longer firing) and friendly fires will not fall upon friendly population.

h. That measured safe distances not firmly established by appropriate supporting data be tested by the proper Armed Forces agencies in order to obtain definitive parameters for simultaneous employment of fire support means.

i. That this study be approved and disseminated to Cavalry Battalion and Artillery Branch level as a vehicle for guidance, reference, and orientation; further, that the study be used for in-processing orientation of prospective S-3's and battalion/brigade commanders.

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ANNEX A: Design Capabilities and Limitations of Individual Fire Support Means (C)

I. Mortars and Cannon Artillery:

1. (U) General: All mortars and artillery weapons within range of a target, regardless of the headquarters controlling the weapon, can be coordinated to attack that target.

2. (U) Capabilities common to mortars and cannon artillery:

a. Weather has minimal effect on delivery of high explosive rounds.

b. Firing elements within range can be massed on a single target effectively.

c. Accurate observed and unobserved fires can be delivered.

3. (U) Planning considerations for mortars and cannon artillery:

a. The greatest probable error in delivery occurs along the gun-target (G-T) line (an imaginary line drawn from firing weapon to the target). Consequently it is desirable to employ a firing element for which the G-T line, or its extension, will not pass over friendly elements near the target.

b. Effectiveness of weapons smaller than medium (155 MM) artillery is reduced significantly when attacking heavily forested/fortified areas.

c. The minimum safe distance for friendly troops equals four (4) probable errors plus the bursting radius for the artillery in question. This distance provides 99% assurance of safety (See tables for probable errors of artillery weapons).

4. (U) The Available Supply Rate (ASR-expressed in rounds/tube/day) currently is a restrictive factor for several types of ammunition. When friendly units are in contact, adherence to the ASR may be waived. However, it is at all times incumbent upon the maneuver force to request and upon the fire support element to analyze proposed artillery attack of targets in a manner that assures ammunition will not be expended needlessly--thereby affecting adequate support of more lucrative targets when they appear.

5. (C) Reaction times: For the purpose of this study, reaction time constitutes that time between receipt of a fire mission at FDC and first round fired.

a. The reaction times for mortars and cannon artillery weapons remain relatively constant, regardless of weather and terrain. However, non-technical considerations, such as clearances and number of missions being processed simultaneously, sometimes will increase reaction times considerably.

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b. Some of the more fruitful means of improving reaction times within Division organizations are:

- (1) Anticipating needs so that political/military clearances can be obtained in advance.
- (2) Transmitting of firing data to AWCC's carefully.
- (3) Improving RTO proficiency within all elements.
- (4) Controlling air traffic carefully to avoid unnecessary "chock fire" situations caused by aircraft within AO.
- (5) Realizing that when an artillery Battalion receives a multitude of missions, it is the duty of the S-3/FDO to determine the priorities of fire--based upon the number of batteries available to fire. Consequently, those missions which are not of an urgent nature will be fired after the more urgent missions have been completed.
- (6) Improving communications by minimizing frequency conflicts, improving communications discipline, and establishing relays.
- (7) Training personnel more intensively.
- (8) Frequent and accurate reporting of friendly locations to the fire support elements.

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PARAMETERS	REACTION TIMES (AVERAGE) (C)		
	Btry #1 (105MM) 399 Missions	Btry #2 (105MM) 385 Missions	Btry #3 (155MM) 359 Missions
Reaction Time Presented in ATT	1-2 Minutes	1-2 Minutes	1-2 Minutes
Clearances not a problem (1 Min. Av. to clear)	4.5 min. 173 Msns	3.5 min. 159 Msns	9.1 min. 163 Msns
Problems in clearance (2-10 min. to clear)	7.3 min. 34 Msns	NOT AVAILABLE	NOT AVAILABLE
Problems in clearance (10-20 min to clear)	11.8 min. 57 Msns	17.3 min 55 Msns	NOT AVAILABLE
Problems in clearance (30 plus min to clear)	94 min. 20 Msns	NOT AVAILABLE	42 min. 23 Msns
Problems with air advisories (2-10 min.)	9.1 min. 43 Msns	8.5 min. 26 Msns	NOT AVAILABLE

Notes:

1. Table derived from missions over a 30 day period of 3 randomly selected batteries.
2. Not all missions were contact missions.
3. Missions not averaged include "at my command," "Check fire," and Preparations, because of the necessary time interruptions.
4. 155MM howitzer: Demand for 6400 mil capability causes delays whenever howitzers must shift trails to lay on target.

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81MM Mortar

TYPE ORNANCE	MAXIMUM RANGE	MAXIMUM RATE OF FIRE	SUSTAINED RATE OF FIRE	RADIUS OF BURST	MAXIMUM PER PED	MAXIMUM ASR	NATURE OF TARGET	REMARKS
HE(M374)	4737M	18/Min 2 Min	3 Min	11M	27M	94	2000 per Bn	Personnel in open or in uncovered positions
HE(M43A1)	3701M	"	"	7M	"	"	Unk	Personnel in open or in uncovered positions
WP	4737M	"	"	N/A	"	"	N/A	Personnel, wood structures, light vehicles
ILL	2100M	"	"	N/A	"	"	N/A	Area illumination 1. Burn time: 45 Seconds 2. 450,000 candle power

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4.2 Inch Mortar

HE	5640M	18/Min 1 Min	3/Min	15M	34M	74	Unk	Personnel, wood structures, light vehicles, fortifications
WP	5640M	"	"	"	"	"	N/A	Personnel, wood structures, light vehicles
ILL	5640M	"	"	N/A	N/A	N/A	N/A	Area Illumination 1. Burn time: 70 seconds 2. 500,000 candle power

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105MM Howitzer

TYPE ORDNANCE	MAXIMUM RANGE OF FIRE (3 Min)	MAXIMUM RATE OF FIRE	RADIUS OF BURST	MAXIMUM PER	MAXIMUM PED	ASR NATURE OF TARGET	REMARKS
High Explosives (HE)	11.5KM 10/11	3/M	15M	18M	3M	32.5 Personnel; light equip, structures and vehicles	Effectiveness reduced in heavy forests
Illum- inating (ILL)	9KM	"	N/A	N/A	N/A	Target area illumina- tion, or self illumination	1. Burn time 69&70 sec. 2. 450,000 & 600,000 candle power 3. 2 rds/min for continuous illu. 4. Canister impact must be considered.
Smoke (SK)	11KM	"	N/A	18M	3M	N/A Marking locations, -screening	Screening affected by wind, humidity and turbulence
ICM	10.2KM	"	140M (Volley)	Unk	Unk	2 Personnel in open or without overhead cover	1. Effective in forest. 2. Not to be fired closer than 600M to friendly elements.
Beehive	Indirect " 11.5KM Direct 300M	"	Indirect N/A 190M Direct 94M	N/A	N/A	N/A Personnel in open	Available fuze pro- cludes firing over heads of friendly ele.
White Phos- phorus (WP)	11.5KM	"	15M	18M	3M	N/A Personnel, wood struc- tures, light vehicles Marking	Can be used for
CS	8.5KM	"	180M (Volley)	"	"	N/A Personnel	Affected by wind, humidity, turbulence

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TYPE	MAXIMUM RANGE	MAXIMUM RATE OF FIRE (3 Min)	SUSTAINED RATE OF FIRE	RADIUS OF BURST	155MM Howitzer		NATURE OF TARGET	REMARKS
					MAXIMUM PER	MAXIMUM PED		
HE	14.6KM	4/5Min	1/Min	25M	57M	8M	30 Personnel, light armor vehicles, buildings	1. Burn time: 60 & 70 seconds 2. 600,000 and 1 Million candle power 3. 2 rds/min for constant illumination 4. Canister impact should be considered Screening affected by wind, humidity, and turbulence. Effective in forest. Not to be fired closer than 600m to friendly ele.
ILL	14.1KM	"	"	N/A	"	"	N/A Target illumination or self illumination	
SMK	14.6KM	"	"	N/A	"	"	N/A Marking locations, screening	
ICM	14.5KM	"	"	150M (volley)	Unk	Unk	16.6 Personnel in open or without overhead cov.	
WP	14.6KM	"	"	25M	57M	8M	N/A Personnel, wood structures, light vehicles	Can be used for marking.
8 Inch Howitzer								
HE	16.8KM	1.5/Min	0.5/Min	40M	28M	8M	25 Personnel, concrete bunkers, vehicles	Capable of point destruction missions
ICM	12KM	"	"	135M (Volley)	"	"	N/A Personnel in open or w/o overhead cover	Not to be fired closer than 500m to friendly elements.
175MM Gun								
HE	32.7KM	1.5/Min	0.5/Min	48M	143M	20M	Varies Personnel, vehicles, fortified areas	

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FUZE TYPE	CALIBER OF TYPE OF WEAPON	AMMUNITION	FUNCTION CHARACTERISTICS	NATURE OF TARGET	REMARKS
IMPACT (PD)	ALL	HE, WP	Detonates upon impact (Q), a fraction of a second after impact (Dolay)	Q: Personnel in open or lightly protected, light equipment or structures DELAY: Lightly fortified bunkers, weapons, buildings	1. Early burst can be expected in heavy rain. 2. Q & Dolay should be used together in heavy forest. 3. Higher dud rate when dolay is used on soft ground.
MECHANICAL TIME/SUPER QUICK (LT-Q)	ALL, but 175MM Gun	SEK, CS, HE, WP, ILL	Height of burst (HOB) above target can be adjusted.	1. Personnel in open or without overhead cover - HE. 2. Marking - WF	1. Early burst can be expected in heavy rain. 2. Optimum effect of HE lost on ground when fired over heavy forested areas.
PROXIMITY (CVT)	ALL	HE	Optimum HOB Automatically obtained	Personnel in open or without overhead cover or structures	1. Early burst can be expected in heavy rain. 2. Heavy forests and bodies of water cause HOB over the ground greater than optimum.

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II. Aerial Rocket Artillery (ARA)

1. (U) General: The mission of ARA is to provide direct fire support by means of aerial rockets to the Division's maneuver elements. For the purpose of this study, only the 2.75 inch SSFAR rocket will be discussed since the turret systems are primarily used for defensive purposes on ARA aircraft. However, the turret system, which includes 7.62mm and or 40mm grenade launcher, may be employed offensively if required.

2. (C) Fixed Capabilities and Limitations.

a. Fixed capabilities and limitations of aerial artillery fire support are closely related to that of all aircraft. Limitations include weather, especially visibility. Although the weather capability of each pilot varies, a general rule of thumb, that can be used is that ceilings (more than .4 cloud cover) of 1500' day, 2000' night and visibility one mile day, three miles night in the target area will allow successful completion of an ARA mission. Missions can be accomplished with reduced ceilings and visibility; however the completion of the mission is inhibited and aircraft vulnerability is greatly increased.

b. Range of an aerial artillery section is dependent on the proximity to refuel points. For example, the Huey Cobra cruising at 100 knots per hour carries 1 hour and 30 minutes of fuel. Since it will normally take a section 15 minutes (average) to complete a mission and in that refueling points are normally quite some distance from the target areas it will be assumed that the section must return to its point of departure (POD) to refuel. Thus the target must be within 68.7KM of the POD and the section must be allowed to expend immediately upon reaching the target in order to successfully complete the mission. As the target moves closer to the POD, station time increases. The three main fixed POD for aerial artillery are Tay Ninh, Quan Loi, and Phuoc Vinh. Lager positions are established as the tactical need arises; however, those bases must be relatively secure from ground or indirect fire attacks.

c. Aerial artillery can provide flexible response due to its mobility. For example, availability of aerial artillery will be between 12 (24 ARA aircraft) and 16 (32 ARA aircraft) mission ready sections within the battalion. These aircraft are maintained on strip alerts of two minutes and five minutes at each major POD. As these sections are bounced on fire missions replacement aircraft assume the 2 minute and 5 minute alert status.

If heavy commitments arise in one area of the TAOR normally covered by one battery, supplemental sections are sent to that battery to avoid mission refusals and to reduce reaction time (from mission receipt at battalion to time on station. This response time averaged for a random period of time, selecting typical fire missions in the area surrounding Quan Loi was eleven (11) minutes (the briefing time upon arrival on station is not figured).

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d. Aerial Artillery helicopters are capable of providing armed aerial escort, reconnaissance and security, but primarily are missioned for direct fire support. They should be used "...in the artillery role against specific targets as opposed to aerial escort, reconnaissance, or air cover for which other armed elements of the division are specifically equipped..." (See 1st Cav Cir 525-8). Using ARA in roles other than their specific assigned mission reduces responsiveness, availability and effectiveness.

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2.75" SSFAR Munition	RSR	BEST TARGETS	REACTION TIME	AVERAGE VOLUME/SECTION	MSD*	REMARKS
M151(10/1b)	.29/tube/day based on 30 day month & 2736 tubes in Bn.	1. Troops in open 2. Light cover 3. Close in fires	2 minutes plus flight time from Phuoc Vinh, Quan Loi or Tay Ninh	112 rockets	50 meters	
XM229(17/1b) W/PD Fuze	.15/tube/day	1. Troops in open 2. Light cover 3. Partially effec- tive against bunkers	2 minutes plus flight time from Phuoc Vinh, Quan Loi or Tay Ninh	32 rockets*	100 meters	*Plus 76 M151 (10 1b) PD rockets. If only XM229 is loaded, 88 would be carried.
M151 (10/1b) W/VT Fuze	None yet compiled	1. Gaps only	30 minutes plus flight time from Phuoc Vinh, Quan Loi or Tay Ninh	36 rockets*	150 meters	*Plus 76 M151 (10 1b) PD rockets.
SM229(17/1b) W/VT Fuze	.044/tube/day	1. Gaps only	30 minutes plus flight time from Phuoc Vinh, Quan Loi or Tay Ninh	32 rockets*	200 meters	*Plus 76 M151 (10 1b) PD rockets
Flechette	.056/tube/day	1. Gaps 2. Troops under canopy jungle cover 3. Troops in open	30 minutes plus flight time from Phuoc Vinh, Quan Loi, Tay Ninh	30 rockets*	500 meters	*Plus 76 M151 (10 1b) PD rockets
Smoke	.010/tube/day	1. Markings				

*MSD's are to be used as a guide and can be violated only when the ground commander will accept the risk involved to his troops. MSD's are increased by 50 meters when firing other than paralleled to friendly troops.

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III. Air Force Weapons

1. (C) The United States Air Force supports the United States Army mission with FAC controlled air strikes, radar controlled bombing and night oriented special mission aircraft. Most of these systems are available for preplanned and immediate requests.

a. FAC controlled air strikes include preplanned attacks on targets using the best available ordnance for that type target and immediate strikes using air that is available at the time.

(1) The immediate requests use resources available from diverted flights, alert a/c preloaded for typical immediate type targets, and turn-around flights loaded with specifically requested ordnance.

(2) Reaction time varies with availability of a/c and their location at the time of the request. The normal time for processing an Immediate Air Request (TIC) varies from 3 to 5 minutes from the initial request of the Ground Field Commander to the time the III DASC/II FFV is notified of the requirement for air or the S-3AIR/G-3AIR diverts aircraft within their resources.

b. Selection of ordnance for an Immediate Air Request is a secondary consideration and Time on Target is the primary consideration. The selection of available resources follows a sequence starting at the lowest level, (Brigade to the highest (7th AF TACC)).

(1) A preplanned strike mission with acceptable ordnance can be diverted within the Brigade to an immediate target anytime up to the point of expenditure on last item of ordnance. Reaction time for a pre-planned mission is 5 to 10 minutes.

(2) Aircraft diverted by G-3AIR from another Brigade within the Division can take from 10 to 20 minutes, if already on station, or arrival time plus 10 minutes.

(3) A flight can be diverted by III DASC/IIFFV from within the III CTZ or received them from II CTZ or IV CTZ. This could take from 15 to 30 minutes depending on location of the diverted flight.

(4) Most fighter bases maintain aircraft on alert which can be scrambled to meet theater requirements; scrambling is coordinated through TACC/7AF. A/C on 5 minute alert can be at the LACD TAOR next distant point from Bien Hoa in 15 minutes. If launched from a northern base the time is on the order of 30 minutes.

(5) Aircraft loaded on request and launched ASAP would require excessive time and would only be acceptable in a sustained contact where many sorties are expended over a relatively long period of time.

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(6) Ordnance selection on any one sortie is dependent on pre-load configuration and A/C limitations, i.e., (1) F100 A/C must drop pairs from outboard stations, singles or pairs from inboard stations and singles or pairs from intermediate stations. This is necessary to maintain acceptable center of gravity. Alert A/C are loaded with one A/C with all bombs and the other with all Napalm. The FAC can select the sequence of delivery by which A/C he clears to drop each pass and where he places the ordnance.

2. (U) A.S.R. is a factor affecting availability of ordnance on the daily frag order. Since the Division has little control over the actual ordnance on mission A/C assigned and will use what is available within the limitations of the ordnance, we will assume that sufficient quantities exist to meet the requests.

3. (U) The flexibility of ordnance is somewhat limited. On short notice requests, such as TIC missions, the available load of alert or divert a/c will be considered, and where acceptable, will be used to fill Immediate Requests. The alert F100/F4C normally have high drag bombs loaded on one a/c and Napalm on the other, plus 20MM on each. Since alert aircraft have ordnance acceptable for TIC missions and the FAC has an option to select the sequence of delivery, limitations in flexibility should not be considered restrictive.

4. (C) The primary consideration of the FAC in expending ordnance is troop safety distances required by different types of ordnance. (See Table). The safe distance parameters include 150% expected delivery accuracy, 200% weapons lethal radius, 60 meter target identification error for high angle, delivery, and 30 meter error for low angle delivery. Minimum safe distance for protected troops assumes them to be in armored vehicles, bunkers, trenches, or fox holes. Troops must be shielded from point of detonation. Unprotected troops are considered to be standing in an open field, and skin penetration by fragments is used as lower limit on velocity.

5. (U) Weather is a limitation on any airborne activity dependent on visual contact with the ground. Clouds must be high enough to permit unobstructed base leg altitudes for delivery system in use. The visibility (generally 3 miles or better) must be at least that required to keep target area in sight. Haze may preclude continuous view of the target, but base and final pattern altitudes must be selected that permit target acquisition prior to final approach. (See Table). The launch and recovery (or alternate base) must be at or above established weather minimums for the aircraft in a later section.

6. (U) Range is not a factor as fighters will be assigned from bases within range. Time on station does vary; the availability of a/c from a nearby base will give minimum reaction time and maximum station time. If the a/c is launched from a distant base and diverts from an adjacent area, his reaction time could be very rapid. The FAC has the ability, if fighter fuel permits, to expend the ordnance in singles, extending fighter time in the area from 15 to 30 minutes. However, if fuel is short, the FAC can have fighters salvo

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on a single pass and expend in less than 5 minutes.

7. (U) A flight of fighters has the ability to deliver about 5 tons of ordnance during a normal mission, varying in sizes which permit either concentration or area coverage.

8. (C) Radar Controlled Weapons Delivery. Radar is used to control the flight path of a delivery a/c to a point from which ordnance can be dropped onto a target grid.

a. Weapon considerations are the same as for visual delivery.

b. Reaction time is slow by comparison with FAC controlled visual delivery. Normally, a preplanned mission can be changed to a radar controlled mission if there is at least one (1) hour remaining to TOT.

c. 1st Cavalry Division has established 1000 meters as a minimum safe distance for friendly troops.

d. Turbulent weather between a/c and target could affect trajectory of weapons and give a larger dispersion pattern than normal.

e. Station time is minimum since a salvo drop is made on the first pass over a release point. Dispersion from a salvo drop should not be greater than that for individually dropped weapons using high angle-dive delivery method.

9. (C) Night Oriented Special Missions - Flareships, Gunships and FAC's are available to Ground Commanders through coordination with G-3A.

a. Flareships (Moon Shine) can provide continuous flares for illumination of a battle situation. Moon Shine does not possess an offensive weapons system of its own; it only supports weapons systems from other sources.

(1) Weather must be above a working altitude of approximately 4000' AGL.

(2) Reaction time to the farthest corner of TAOR is approximately 45 minutes. If the a/c is airborne when the mission is received, reaction time will be reduced.

(3) Moon Shine has a station time of up to 6 hours depending upon previous flying time used prior to arrival and previous use of its 128 flares. Each flare burns for approximately three (3) minutes and the flares are dropped in 1-2-3 or 4 units.

b. Gunships (Spooky, Shadow) have the capability of providing a sustained high rate of small arms fire on ground targets under night visibility conditions.

(1) Gunships are good area weapons against troops in the open or under light cover, and can provide cover fire for medevac's or friendly troop movements.

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(2) Gunships normally are assigned to areas of operation nightly and are available on call if working in TAOR or ADJ TAOR's within the III CTZ. They can be on station in a relatively short time.

(3) Spooky (22,000 rds & 32 flares) and Shadow (31,500 rounds and 24 flares) are armed with 7.62 Mini guns. Sustained rates of fire of 5000 rds/min/Mini Gun are available in one or multiple mini-guns.

(4) ASR is not a factor.

(5) The visibility must be great enough to permit unobstructed view of the target and clouds must be high enough to permit 3000' - 4000' pattern.

10. (C) FAC's can direct air strikes under a flare ship when ground situation is critical. Limitations and restrictions of many a/c in a limited air space makes the situation hazardous at best. Additional time is required for coordination in providing illumination, target acquisition, target marking, and ordnance delivery on a minimum number of fighter passes.

11. (C) Air Force Ordnance.

a. Fighter delivered ordnance that is used in direct support of ground troops can be listed in 6 categories:

- (1) General Purpose Bombs - low drag
- (2) General Purpose Bombs - high drag
- (3) Napalm, finned and unfinned
- (4) Rockets
- (5) Cannon and guns
- (6) Cluster Bomb Units (CBU)

b. General Purpose Bombs (Low drag or slicks): GP bombs are used for airbursts (w/fuse extenders), for blast and fragmentation against troops in the open, and for targets susceptible to overpressure (e.g. hoochos). The contact or instant fuses are used to penetrate jungle and to achieve craters, and against hard bunkers and tunnels.

c. General Purpose Bombs (High drag or snake): High drag or retarded bombs are used against small targets where accuracy counts. There is a slight degrading of the crater and penetration effects of the bombs but accuracy of delivery more than overcomes the disadvantages.

d. Napalm (Nape): Napalm (fire bombs) is used against flammable targets

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and troops in the open or in burkers. Finned nape follows a ballistic path during delivery and is good for jungle penetration. Unfinned nape tumbles and is used against fairly open targets.

e. Rockets: Rockets are used on area targets of lightly protected troops and equipment. They are fired in groups of 19 from multiple pods.

f. Cannon and Guns: Cannon fires an explosion projectile with great accuracy for use against lightly protected troops and equipment.

g. Cluster Bomb Units (CBU): CBU is a special family of ordnance that has some application in support of troops in the field. The CBU's used are anti-personnel and anti-materiel weapons and cover 30 X 300 meters or 300 X 365 meters, depending upon the type of units.

h. Table:

			Minimum Distance				
<u>Weapons</u>	<u>Fuses</u>	<u>Protected</u>	<u>Unprotected</u>	<u>Del Angle</u>	<u>Base Alt</u>	<u>Min Alt</u>	
500#GP MK 82	IED*	218	730	30°	10000	2000	
750#GP M117	IED	193	880	30°	10000	2000	
1000#GP M65	CDE	240	914	30°	10000	2000	
2000#GP Mk84	IED	240	750	30°	4500	500	
500#Ret Mk82	CD	142	730	10/15°	4500	500	
750#Ret M117	C	143	880	10/15°	4500	500	
Napalm	C	75	---	10/15°	4500	500	
Rockets	C	217	223	20/30°	8000	1700	
Cannons & Guns	C	25	---	10/45°	8000	----	
CBU	CI	105/1000	212/1000	----	----	----	

Typical patterns are for the F-100; the F-4 would be higher, and AT-37/A-1 would be lower.

*Note: I - Instant, E - Extender, D - Delay, C - Contact

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IV. Air Cavalry Squadron.

1. (U) The Air Cavalry Squadron cannot be considered purely as a means of fire support available to the maneuver unit commander. However, because of the capabilities of the Air Cavalry and the influence it may have on both the employment of fire support means available and on the maneuver plan, it is deemed appropriate to include the Air Cavalry in a study of capabilities, limitations and techniques of employing available fire support means.

2. (U) The mission of the Air Cavalry Troops is to perform reconnaissance and to provide security for designated major combat elements; to engage in combat as an economy-of-force unit; and to provide limited air anti-tank defense for elements of the division. It also has organic fire power available and the capability to provide close fire support to troops in combat.

a. The very limited air anti-tank capability of the Air Cavalry Troop will not be discussed, as it is considered irrelevant to this study.

b. Close fire support to troops in contact degrades accomplishment of the Air Cavalry Troops' primary mission and is provided only in response to a tactical emergency. In such cases Air Cavalry Troop support supplements or substitutes for that of ARA, and a discussion of the specific capabilities and limitations of the ARA applies to the Air Cavalry Troop as well.

3. (U) The performance of reconnaissance and security missions will be considered together in this discussion. Generally the capabilities and limitations that apply to the reconnaissance mission will also apply to the security mission. The integration of the fire support for the security mission with the overall fire support scheme will be discussed.

4. (U) The capabilities and limitations of the Air Cavalry Troop to perform reconnaissance and security missions in support of troops in contact will be discussed considering factors which have a profound influence on these capabilities and limitations.

a. The Air Cavalry Troop can perform its mission in all terrain and vegetation conditions encountered in Vietnam. Flat terrain with little or no vegetation presents the most ideal conditions while mountainous terrain with dense jungle is the most restrictive. Therefore, the dimension of the battlefield that can be properly reconnoitered or secured by the Air Cavalry will be dependent upon the conditions of terrain and vegetation.

b. The normal reaction time for Air Cavalry support is five (5) minutes plus travel time. Travel time can be estimated at two (2) kilometers per minute. Reaction time will often be faster when a team already in the AO can be diverted.

c. The minimum safe distance from friendly elements for employment of the Air Cavalry is not applicable except where it applies to the positive

and precise identification of the friendly positions on the ground. When this identification has been made, the Air Cavalry can work over the heads of the friendlies if it becomes necessary. The gunship cover, however, needs some maneuver space at 1000 to 2000 feet so he can perform his functions of, navigation, communication and protecting the scout aircraft. When the Air Cavalry is employed to provide close fire support, the minimum safe distance requirements of ARA apply.

d. Ideally there should be at least a 1500 foot ceiling and 3 mile visibility. The mission can be performed satisfactorily with an 800 foot ceiling if the enemy is not employing .30 caliber anti-aircraft machine-guns or larger weapons. When employed against an enemy who is actively engaging the helicopters and the ceiling is below 800 feet, it becomes necessary to fly at treetop level to avoid unacceptable losses. The Air Cavalry's mission capability is greatly reduced whenever the visibility is less than two miles.

e. The range of the Air Cavalry Troops enables them to support the maneuver units of the MACV whenever they are employed in Vietnam.

f. The time on station of an Air Cavalry team is normally 2 hours, minus the travel time to and from the nearest refueling and rearming point. Continuous employment can normally be maintained during daylight when a tactical requirement exists.

TACTICAL OPERATIONS AGAINST BUNKER COMPLEXES

Troops Not in Contact (Pre-planned)

<u>TIME (Minutes)</u>	<u>ACTION</u>	<u>COMMENT</u>
M	Deliver CS in bunker area by Cav bird	E-158 bomblet from Bn Log bird
M plus 10	AF deliver CBU 25's in the CS area	AF planes must be on station by M minutes
M plus 12	AF deliver 750 lb bombs by salvo in the area	FSCC will request F4's (total 20 750 lb bombs)
M plus 15	Put more CS into the area	Cav Logbird
M plus 25	Saturate the area with tube artillery	Mix fuze delay and quick. Continue until troops approach.
M and 30	Use ARA & Scouts for the final entry into the bunkers	

Notes:

1. The LZ must be about 30 minutes march from the bunkers.
2. If Napalm is substituted for 750 lb bombs the second application of CS should be eliminated.
3. Critical times are the 10 minute periods while CS is penetrating the bunkers.
4. Everything should be pre-arranged so that when the fighters arrive on station M Minute can be declared and the sequence run. AF stay time, particularly with F4's is limited. The CS bird can mark the center of the target area with a WP grenade for the FAC.
5. CS bomblets should be stockpiled at the firebase and the chemical NCO trained to use them.

Incl 3

TACTICAL OPERATIONS AGAINST BINKER COMPLEXES (Con't)

Troops In Contact

<u>TIME</u> (Minutes from contact)	<u>ACTION</u>	<u>COMMENTS</u>
C	Contact	Request A/S, CS, Arty smoke.
C plus 2	Deliver Arty smoke on friendlies	Should be an automatic action by FO & Co Commander
C plus 15	Engage with ARA until arrival of CS bird; for CS deliver CS in the bunker area	Use Bn log bird
C plus 25	Saturate the area with tube artillery until fighters arrive.	Once disengaged do not use ARA.
C plus 45	Deliver Napalm on the complex; follow with 750 lb bombs if carried.	At this time unit is considered to regrouping and be preparing to attack the area later.

Notes:

1. Arty batteries must always have smoke ready to deliver into the area ASAP.
2. If not airborne the C&C ship should be scrambled.
3. Critical times are the initial moments during recovery of the wounded and disengagement; and, the 10 minute period between the delivery of CS and tube artillery.

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